The Seed Technologist Newsletter

A newsletter for members of AOSA-SCST

Volume 91 No. 1
April, 2024

Meet new AOSA Newsletter Editor Kathryn McGinnis, Botanist, USDA

Analyzeseeds.com

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The Seed Technologist Newsletter

A newsletter for
The Association of Official Seed Analysts
and
The Society of Commercial Seed Technologists

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April, 2024

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AOSA President

Newsletter Submission Guidelines

Articles should be typed, pertaining to some aspect of seed testing or other items of interest to the AOSA and SCST membership. These may include, but are not limited to:

Ongoing research
Committee and Working Group activity
Updates on the financial state of the organizations
Distinguished member profiles
Profiles of new members to the organizations.
Research paper abstracts
Results of research, referees, and validation studies
Upcoming changes to the AOSA Rules
Upcoming changes to the By-Laws of either organization
Survey study results
Information from other seed-trade organizations
Regional updates to state seed laws or RUSSL
Information on upcoming workshops or other opportunities for training
Book and resource reviews
Impressions from the Annual Meeting

Formatting:

Please include images as **separate** files, with credit to the photographer if different than the author. All images used will be credited.

For specific formatting within a document, please do not insert images, but leave a placeholder so that the editorial staff can include appropriate images, graphics, and tables within articles.

Please do not submit PDFs of articles.

Citations:

Cite image sources and references used.

Cite any additional sources used to compose the article, including co-authors so that they may be credited.

Author's name and contact information to be included in our contributor's page.

Publications must be in accordance with the Anti-trust policy of the AOSA- SCST.

Calendar of Events

April

ISU Seed School Germination: April 15-19, 2024 *Exam April 19 Purity: April 22—25, 2024, *Exam April 26	Iowa State University, Seed Science Center, Ames, IA
OSA Spring Workshop & Professional Development April 23-27, 2024	Chemeketa Community College Agricultural Center, Salem, OR
CDFA Purity & Germination Workshop—#2 April 24—26, 2024	California State Seed Lab, Sacramento, CA

May

ISF World Seed Congress 2024 May 27—29, 2024	Rotterdam, The Netherlands

June

AOSA/SCST Annual Meeting June 1—6, 2024	Rapid City, SD
OECD Annual Meeting June 10—14, 2024	Nice, France
ASTA Leadership Summit June 15, 2024	Nashville, TN

July

ISTA Annual Meeting July 1—4, 2024	Cambridge, UK
Seeds Canada Annual Meeting July 8—10, 2024	Edmonton, Alberta, CA
Deadline for all items for AOSA-SCST Proceedings July 12, 2024	Send to Communications & Publications Committee
NSTA Seed Conference July 16-18, 2024	Sioux Falls, SD
National Association of Plant Breeders July 21—25, 2024	St. Louis, MO

August

ASTA Management Academy 2024 August 27, 2024	West Lafayette, IN
USDA Seed School August 12—14, 2024, Purity exam: August 15 Germination exam: August 16	Gastonia, NC

October

ASTA's Forage, Turf, & Conservation Seed Conference 2024 October 30, 2024	Kansas City, MO
Deadline for submissions for fall newsletter October 31, 2024	Send to Communications & Publications Committee

Table of Contents

From the Leadership of AOSA-SCST

Johnny Zook, CSA—AOSA President

When I was a teenager, there was a cheesy commercial involving two young people. A woman was walking down the street absentmindedly listening to music on her Walkman, eating from a container peanut butter. Coming from a side street was a man doing the same thing, but this time eating a large plain bar of chocolate. The two converge/collide into each with the fortuitous result of the chocolate bar being dipped into the peanut butter. The two initially complain, but then they try this wild *new* concoction and voilà! Peanut butter cups are born. The young woman then plugs her headphones into the young man's Walkman, and together they walk down the street happier than they have ever been.

I think that this commercial that can be an analogy for AOSA and SCST. Although I don't want to take the analogy too far, I do think our organizations have been on course to come together for a long time. I also think that if we come together, what we form will be an enhancement over what we have now.

As others stated before, the financial side of things is an important factor, the redundant activities are a drain, and the work we do is independent of the lab we work in.

Pooling the resources from both organizations will help to shore up the financial side of things and reduce our costs; like sending two presidents to the same meeting (AOSA and SCST have represented each other's organization at affiliate meetings, but it's not ideal because it always feels like a lack of participation on someone's part).

As an example of redundancies, the AOSA and SCST boards typically consult with each other to make sure that the decisions made do not interfere or cause any issues for the other. This means we have a Board meeting and then let the other Board know about the issue, and then that Board meets to talk about it, and then both Boards come together to meet and make a decision. Additionally, we have so many chairs and co-chairs, to assure ASOA and SCST representation on our committees, we are stretching ourselves thin.

As seed analysts/technologists it is our job to try to achieve the most accurate analyses possible. Whether we work in a private or public Seed Lab, we are trying to achieve precision and repeatability in our seed testing results. Granted, how the regulatory authority or the consumer purchasing the testing uses the results is up to them, but the product of the lab should be reliable no matter who uses it.

I believe as seed consumers are pushing more and more for seed from "novel" species, as we see a noticeable increase in the interest of using and requiring native species, and as our traditional species increase in complexity with development of new technologies, AOSA and SCST will need to consolidate to meet the new demands. As these areas change and expand, we will need to continue modernizing/updating the AOSA Rules for Testing Seeds and offering training and growth opportunities for our members. Having a strong organiza-

tion that has financial stability and a reasonable expectation of its volunteering members will make this possible.

The consolidation working group has been meeting regularly and working hard to bring in various points of view by reaching to the USDA, affiliate organizations, the Boards, the previous consolidation working group, and hosting a webinar explaining the proposed organization. They have been streamlining the proposed by-laws and moving the day-to-day operations into SOPs. The hope is this will reduce the need for us to constantly update the by-laws and give us more flexibility to make changes as we need them.

To return to the analogy, we see in the commercial that the initial collision led to complaints: "You got your chocolate in my peanut butter," and "You got your peanut butter on my chocolate." The consolidation of AOSA and SCST, if successful, will most certainly lead to initial complaints, but this is part of the refining process that can only happen *after* we come together. Once we have consolidated, we will have to fine-tune things, but the hope is people will express ALL their concerns so we can try to have our initial set-up as close to the final organization as possible.

The peanut butter cup does not look like the first "mash up" of the chocolate bar and the peanut butter. It looks much better, and it works much better. I hope you can join us at our 2024 annual meeting in Rapid City, South Dakota (see https://analyzeseeds.com/annual-meetings/2024-annual-meeting/ for more information). I encourage all to keep an open mind and visualize a goal where both "young people" are walking down the street happier than they have ever been.

From the Editors

Quinn Gillespie, SCST Editor

Earlier this year an AOSA colleague, Jon Collett at the University of Kentucky, passed along to me some of the archives which had been boxed up in their storage room for many years. One of my happy projects of this spring has been to catalog the old editions of what has been called by one organization *The Newsletter* and the other *Seed Technologist News* and which now lives on as The Seed Technologist Newsletter. Like our organizations, this documentation of our groups remained separate for many years, with a fair amount of overlapping content. Gradually issues grew narrower and closer together, until The Seed Technologist Newsletter became a joint publication in 1998.

What I have found in these old editions of our newsletters and proceedings is the long history of our organizations and how things came to be as they are now, slowly moving together over the past century, plus the minutiae that we, as seed analysts seem to be constitutionally incapable of ignoring.

Like the joining of our newsletters, our consolidation of the exam, and our comingling of our committees, we are on the verge of another big leap forward as organizations, possibly the greatest leap we have made in over 100 years, and one that has been over two decades in the making. Our approach to the consolidation of our two groups comes at a time when coming together is necessary for our survival, not merely for the convenience of avoiding double work. With that in mind, I would like to pull advice from our own history, taken from Volume 33 of The Newsletter, published in 1959.

Let us take this advice from past selves and remember not to let the perfect be the enemy of the good as we move forward with the new chapters of this record, our organizations, and our collective histories.

The following 10 points are essential for any committee intent on doing nothing about a problem:

1. Profess not to have an answer. This lets you out of having any.
2. Say that we must not move too rapidly. This avoids the necessity of getting started.
3. Say the problem can't be separated from other problems. Therefore it can't be solved until all others are.
4. Discover there are dangers in any formulation of a conclusion.
5. Appoint a subcommittee.
6. Wait until an expert can be consulted.
7. For every proposal set up an opposite one and conclude that the middle ground represents the wisest course.
8. State in conclusion that you have all clarified your thinking. This obscures the fact that nothing has been done.
9. Point out that the deepest minds have struggled with the problem. This implies that it does you credit just to have thought of it.
10. Close the meeting by stating it has stimulated discussion, opened new vistas, shown us the way, and challenged our inventiveness.

The Newsletter, Association of Official Seed Analysts, Vol. 33, No.3, 1959.

From the Editors

Kathryn McGinnis, AOSA Editor

Hello all! I'm Kathryn McGinnis and I am the relatively new AOSA Editor for the Publications Committee. I got my Bachelor of Science in Biology from the University of Puget Sound and after bouncing around at several different odd jobs, I stumbled upon the position for laboratory technician at the USDA Seed Regulatory and Testing Division (SRTD). After a few years as a lab tech, I became a Botanist. I cannot say that I expected to become botanist or work with seeds, but I have found a fulfilling career in this interesting field.

SRTD is responsible for enforcing the Federal Seed Act (FSA) and facilitating domestic and international seed trade through a variety of programs. The Seed Testing Program supports the Federal Seed Act Program by conducting truth-in-labeling verification tests on regulatory samples. The Program also offers voluntary fee-for-service seed quality testing. Seed companies that market seed for export constitute most businesses who request these voluntary seed testing services. Test results are reported on USDA Seed Analysis Certificates, which some importing countries require as accompanying information with the seed they import from the U.S. Regulatory and voluntary service testing provided by SRTD include physical purity tests, germination tests, noxious-weed seed examinations, seed moisture examinations, GMO testing, and varietal verification tests.

As a botanist, I get to run those tests and provide results to our marketing specialists. There are some tests that I find a little more fun to run than the others. Personally, I enjoy testing the GMO samples with PCR and Gel Electrophoresis and evaluating the germination seedlings the most. I also give yearly webinars and teach at our annual Seed School about seed identification and testing procedures.

When I am not working on seed samples or helping to enforce the Federal Seed Act, I enjoy cryptozoology, writing stories, and playing Dungeons & Dragons. I do not keep a garden or any plants in my home that aren't plastic, because despite being a botanist, I am a terrible gardener.

Updates from AOSCA

Dr. Sarah Wilbanks, CEO, AOSCA

Greetings AOSA/SCST,

I am delighted to bring you an update on the happenings with AOSCA and announce our upcoming projects.

To start, this past spring, AOSCA adopted a new strategic plan. As an association we felt that we are at a pivotal point where we really needed to carve out what we want seed certification to look like in the future. Acreage numbers have taken a hit over the past several years. Including a 15% decline in total acres equating to an average of about 2.5 % each year over the past 7 years. In 2022 alone this number equates to 250,000 acres we lost in our programs. Our agencies cannot survive if those trends continue, so we know we had to get in front of this decline. To accomplish this, we adopted a strategic plan that outlines our focus for the next three years so we can be intentional about where and how we spend our resources.

In 2023, we decided to do a complete review and modernization of our Standards Book to ensure the AOSCA standards were:

1. Abiding by the Federal Seed Act

2. Relevant

3. Obtainable with current practices, research, etc..

This project resulted in over 30 standard changes, and numerous editorial changes that were voted on by our membership last June and have been added to our standards book. The project was so successful that we decided to do what we are calling a “phase two” review this year, which is reviewing all guidelines and standard operating procedures. Currently, the phase two proposals are being reviewed at each AOSCA regional meeting, and then will move forward to our annual membership meeting in June. At the completion of this review, it is our goal to publish a re-designed and modern standards book for our membership.

Additionally, one of our focus areas resulting from the strategic plan was digitalization and efficiency**.** The AOSCA office has undergone a review of all current programs and has developed efficiency improvement plans for office operations. Our goal is to incorporate digitalization where possible for ease of use by our membership and breeders. One of the biggest projects is building a Variety Review Board database that is accessible to anyone needing to lookup variety descriptions while also automating the Variety Review Process for the ease on our reviewers and breeders. Also, we launched an updated website in 2023 and hope you will all check it out.

Marketing and Communications was identified as a strategic initiative in our strategic plan and we have begun

a Marketing and Communication Plan that will launch in June of this year. Our association did very little with marketing in the past, and we know the needs are vast. Within the marketing and communications plan the idea for AOSCA Ambassadors was born. With a small staff, the association cannot always be at every seed industry event in the US and internationally. So, we have developed a program that allows each agency to self-appoint ambassadors and available volunteer time to help bring our messaging to audiences at the regional, state, and local level. We are excited to launch this program and see how we can heighten the message of certified seed and other AOSCA programs.

Within the Marketing and Communications plan, AOSCA is creating a tool kit for its member agencies containing digital and print materials to utilize in speaking engagements, social media, and more. This tool kit is another example of AOSCA arming its members with resources to grow its audiences.

Education is another strategic initiative and we have been hosting various webinars and learning sessions in the past couple of years. Along the lines of education, in a few weeks we are launching the AOSCA Academy: Training the Future of Seed Certification, a cohort of new and developing leaders from our 45 US Agencies. This is a yearlong program, with the goal of developing AOSCA member's leadership skills, program management, and learning how to navigate AOSCA successfully to benefit their own agency as well as the association. We are so excited about this program and hope it equips our membership with skills necessary to be active leaders in the seed industry.

AOSCA continues to host the Variety Review Boards, with over 250 applications processed in 2023. These boards are compiled of AOSCA, industry, and organizational experts who perform a peer reviewed process for variety eligibility into the certified seed program. The review boards include the crops Alfalfa, Grass, Hemp, Sunflower, and Small Grains. Most recently we launched a Variety Review Board for Dry Beans. By doing this we hope to assist our agencies with the review process by making it consistent for breeders while housing all varietal information that AOSCA agencies need.

We continue to keep our MOU with USDA-AMS which monitors AOSCA's agencies for compliance under the Federal Seed Act. We have an agency evaluation process that is completed annually by an outside party. In 2023, all agencies were found in good standing with the association. This evaluation allows us to ensure all AOSCA agencies are implementing the regulations outlined by the Federal Seed Act uniformly throughout the country.

The AOSCA meeting cycle starts each year with regional meetings each April where we vet standard change proposals and discuss issues facing the region. After regional meetings, working groups continue to adjust proposals to have them ready to present at our annual meeting being held this year in Sandestin, FL on June 16th-19th. We are always happy to have additional attendees at our meetings, so if you are interested, check out the Meetings and Events tab on the AOSCA website for more information. We would love to see more AOSA-SCST members there.

For more information about AOSCA, and its programs please visit the AOSCA website, or reach out to the AOSCA staff, Dr. Sarah Wilbanks (CEO), or Teresa Snyder (Exec. Assistant).

Who is the American Seed Trade Association?

Kaity Crawford, Director, Marketing and Communications, ASTA

Founded in 1883, the American Seed Trade Association (ASTA) is one of the oldest trade organizations in the United States. Its membership consists of nearly 700 companies involved in seed production and distribution, plant breeding, and related industries. ASTA values and promotes diversity of membership, in terms of company size, products, and geographic area served. Each member company is given one vote, regardless of size. ASTA's broad membership offers representation from alfalfa to zucchini and all production types including conventional, organic, and biotech. As an authority on plant germplasm, ASTA advocates for science and policy issues of industry-wide importance.

ASTA's mission is to be the leading voice of action in all matters concerning the development, marketing and movement of seed, associated products, and services throughout the world. ASTA promotes the development of better seed to produce better crops for a better quality of life.

To assure success of its mission, ASTA is guided by a comprehensive strategic plan with goals in 6 key issue areas: domestic policy, innovation, communications, intellectual property rights, international, ASTA membership & internal matters, and sustainability.

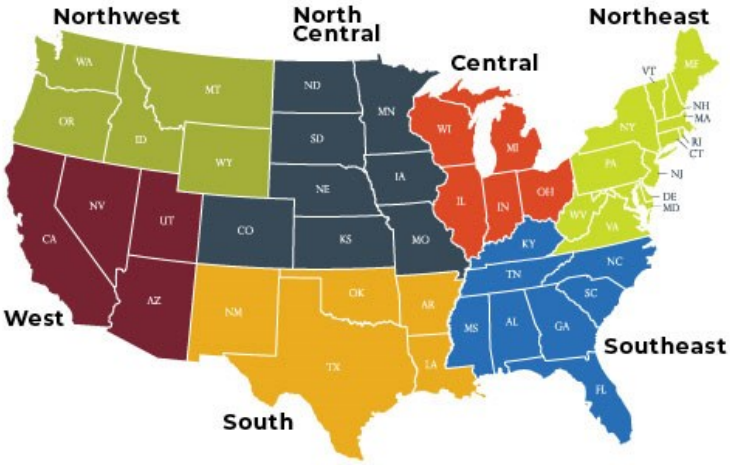
Directed by its members, ASTA is involved in nearly all issues relating to plant germplasm, focusing on three areas of industry importance: regulatory and legislative matters at international, national, and state levels; new technologies impacting all crop species; and communication and education of members and appropriate public audiences regarding science and policy issues affecting the seed industry.

ASTA is driven by its members, which is represented by a board of directors comprised of the chair, first and second vice chairs, the regional vice presidents (RVP), three immediate past chairs, all Directors-at-Large, one member from Seeds Canada, and one member from the Mexican Seed Trade Association (AMSAC). The advisory council supports the board of directors and is comprised of the board and the chairs of select ASTA committees, subcommittees, and working groups. The FY2023-24 officers are:

Chair: David Armstrong, Sakata Seed America
First Vice Chair: Dan Foor, DLF North America, and
Second Vice Chair, Dave Treinen, Syngenta Seeds, LLC

The FY2023-24 RVPs are:

Northwest: Crystal Fricker, Pure Seed
North Central: Eric Woofter, Star Seed, Inc.
Central: Bryan Gerard: JoMar Seeds, Inc.
Northeast: John Bozeman, Seedway LLC
Southeast: John Seymour, Roundstone Seed
South: Luke Turner, Turner Seed Co.
West: John Marchese, The Kraft Heinz Company
Representative from AMSAC: Juan Labastida, Enza Zaden North America, Inc.



ASTA members determine the future of the seed industry through active participation. Grassroots efforts, quality discussions on policy issues, strategic goals, and actions are the cornerstone to ASTA's ability to advocate for the industry. To learn more about the association, benefits of membership, and industry issues, visit www.betterseed.org or email us at info@betterseed.org.

ASTA Staff at the 63rd Vegetable & Flower Seed Conference in Monterey, CA, Photo credit: American Seed Trade Association, 2024

ISTA at 100

Submitted by Andreas Wais, ISTA General Secretariat

This year ISTA celebrates 100 years with recordings and messages from analysts all over the world. ISTA president, Keshavulu Kunusoth and Vice President, Ernest Allen have also prepared a longer webinar celebrating the inauguration of ISTA's centennial. Immediate Past President, Steve Jones, shared his thoughts about 100 years of ISTA in a video message.

"Hi everyone, I'm Steve Jones immediate past president of ISTA speaking to you from my home in Canada. ISTA celebrates its first 100 years in 2024 but how do you congratulate an Association or entity like ISTA? ISTA isn't a faceless Organization. For me when I think of ISTA, I think of the many people I've met at ISTA meetings over the past 20 years I have been involved with ISTA; the many conversations and interesting discussions I've had on seed topics; but I also think about the many people that were there in the time before me and help make ISTA what it is today. ISTA provides a unique service and provides uniformity in testing, sustainable system, efficient use, seed testing rules, all for the greater good and worldwide food production. To maintain that system for the future is essential and I take this opportunity along with many of you to celebrate and congratulate everybody who's been involved with ISTA over the past 100 years; and to also encourage others to join ISTA in the future. So many thanks to all those in the past and those in the future to help ISTA take itself into the next 100 years! Congratulations to everyone! happy birthday ISTA from Canada! Thank you!"

For more about 100 years of ISTA, the ISTA YouTube channel has several short (about one minute) recordings from different ISTA colleagues for the 100-year celebration of ISTA see:
International Seed Testing Association - ISTA - YouTube

The longer webinar produced by Dr. Keshavulu Kunusoth and Ernest Allen launching the 100 years of ISTA, can be found at: 100 Years Inauguration Webinar (youtube.com)

Note: There will also be an ISTA's Centennial Webinar Series. These are 45-minute webinars on various Association and Seed Testing topics. The webinars will be conducted throughout 2024, and each will involve two established members of ISTA (including an honorary member if possible) and a Young@ISTA Member. Starting on 17 April 2024 on the topic of Vigour testing. More topics to be announced later.

2024 Preliminary Virtual Meeting Schedule

Online meeting links to follow, all times are Mountain Time. Times subject to change.

Open Rules Discussion

Time/Date: TBD | Zoom link to follow

Statistics Committee

Tuesday, May 28, 2024, 11:00am—Noon | Zoom link to follow

Moisture Committee

Tuesday, May 28, 2024, Noon—1:00pm | Zoom link to follow

Seed vigor date

Time/Date: TBD | Zoom link to follow

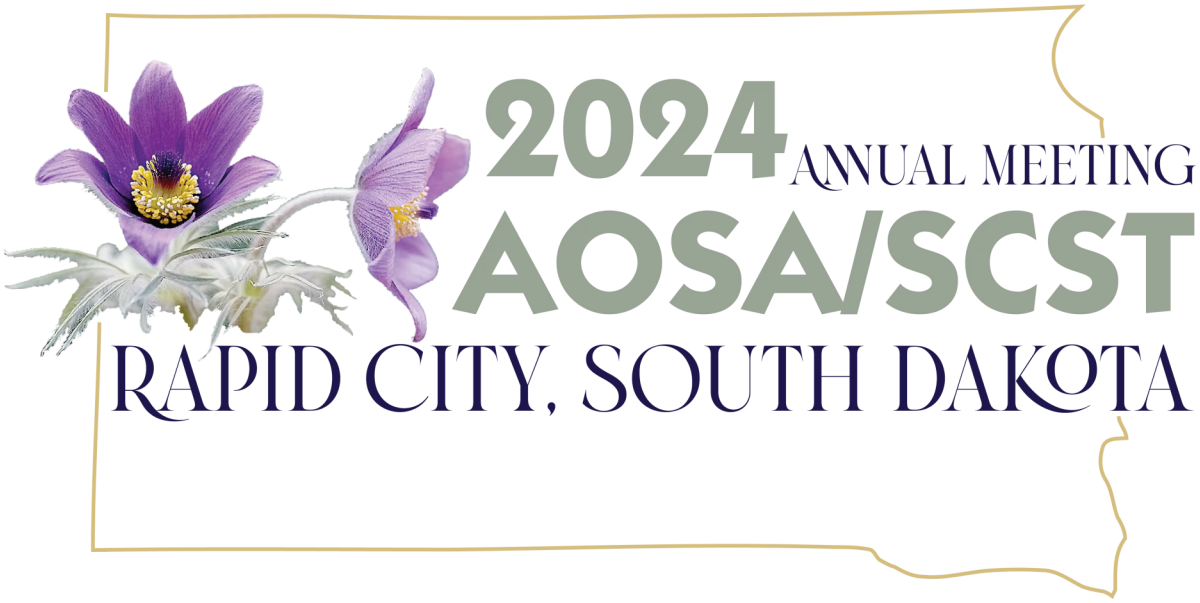
AOSA Bylaws Committee

Time/Date: TBD | Zoom link to follow

Consolidated Exam Committee

Time/Date: TBD | Zoom link to follow

For updates to the virtual meeting schedule check back on the 2024 Annual Meeting page or click the image below.



2024 Annual Meeting Agenda & Schedule

*Registration is open now! Times and room assignments are subject to change. *Recommended for New Attendees*

Saturday, June 1

8:00am—4:00pm	AOSA Board of Directors Meeting (Closed); Montana Room SCST Board of Directors Meeting (Closed); Wyoming Room

Sunday, June 2

8:00am—4:00pm	AOSA-SCST Joint Board of Directors Meeting (Closed), Montana Room
8:00 am—Noon	Seedling Evaluation Workshop—Building on Evaluation Survey Results, TBA
1:00pm—5:00pm	RGT Exam, Salon A Referee Testing and Application of Tolerances Workshop (TBD)

Monday, June 3

7:00am—8:00am	Light breakfast in the Trade Show, Atrium
8:00am—8:30am	Orientation for Newcomers, Salon A*
8:00am—9:00am	Genetic Technology/Cultivar Purity, Salon D* Flower Seed Committee, Salon E Communications & Publications Committee, Salon G & H
9:00am—10:00am	Lab Standards & Documentation, Salon E* Handbook Committee, Salon G & H
10:00am—Noon	Opening Session Brunch, Black Hills Ballroom
12:30—1:30pm	Affiliates/Liaison Meeting (Closed), Salon A International Committee, Salon F TZ Committee, Salon E
1:30pm—2:30pm	Afternoon Break, Atrium, Trade Show—Check out our Sponsors!
1:30pm—3:30pm	Teaching and Training Committee, Salon D* RGT Board of Examiners (Closed), Salon A
3:30pm—5:30pm	Purity Committee, Salon E*
5:00pm—7:00pm	Trade Show Mixer & Seed Issues Forum/Poster Session Reception, Atrium

2024 Annual Meeting Agenda & Schedule

Registration is open now! Times and room assignments are subject to change.

Tuesday, June 4

6:30am—7:30am	Bean Buddy Walk
7:00am—8:30am	Breakfast, Black Hills Ballroom
8:00am—1:00pm	Trade Show, Atrium
8:00am—9:00am	Regulatory Meeting, Salon D
9:00am—9:30am	Continuing Education Points Committee, Salon A
9:00am—10:00am	AOSA-SCST Proficiency Testing Committee, Salon E
10:00am—Noon	Germination Committee, Salon D*
11:30am—12:30am	Boxed Lunch Onsite, Black Hills Ballroom
12:45pm—6:00pm	Board buses—Buses depart 1:00pm Offsite Tour (See tour schedule on p. 15)

Wednesday June 5

7:00am—8:00am	Breakfast, Black Hills Ballroom
8:00am—5:00pm	Trade Show, Atrium
8:00am—9:00am	Ethics Committee (Closed), Salon B & C Open Rules Update, Livestream TBD, Salon D&E*
9:30am—10:30am	Morning Break
9:30am—Noon	Referee Presentations, Livestream TBD* Followed by Referee Buzz Session, Salon D&E
Noon—1:00pm	Lunch, Black Hills Ballroom
1:00pm—2:30pm	Research Papers presentations, Research Committee, Salon D&E*

2024 Annual Meeting Agenda & Schedule

Registration is open now! Times and room assignments are subject to change.

Wednesday June 5 (continued)

2:30pm	Afternoon Break
3:00—5:00pm	Long Range Planning, Livestream TBD, Salon D&E*
5:30pm	Group Photos
6:00pm—8:00pm	Awards Banquet/ STRF Silent Auction, Black Hills Ballroom*

Thursday, June 6

6:30am—7:30am	Breakfast, Black Hills Ballroom
7:30am—9:00am	Joint Business Meeting & Rules Voting Session, Salon D&E*
9:15am—10:45am	SCST Business Meeting, Salon D&E*
10:45am—12:15am	AOSA Business Meeting, Salon D&E*

Tour Itinerary—Tuesday Afternoon

1:00 pm	Depart Hotel—Boxed Lunches provided in Black Hills Ballroom prior to departure
1:45pm	Arrive in Hill City
2:30pm	Steam train ride from Hill City to Keystone
3:30pm	Arrive in Keystone and travel on bus to Mt. Rushmore
4:00—5:30pm	Mt. Rushmore, free time to explore
6:00pm	Return to hotel

It's my first meeting... what should I go to?

Guidance for new members and first time attendees

Orientation for newcomers - This is a short, informal meeting geared toward helping new meeting attendees find their footing. It's a chance for attendees to ask questions, meet some of the members of leadership, and get some guidance in navigating the rest of the week.

Opening Session - In addition to a delicious brunch, members will hear from leadership about plans for the rest of the week. This session also typically includes a keynote address and updates from the leadership of other seed testing organizations, often including ASTA, AASCO, AOSCA, and ISTA. (See abbreviations primer.)

Technical Committee meetings - For many committees this is their biggest meeting of the year. It's a time for the committee to present projects from the previous year, updates on handbooks and rule proposals, and to brainstorm ideas for the coming year. Bring your questions and ideas about committee topics that are the most interesting to you. New members are especially encouraged to come to Teaching and Training with ideas about what topics would benefit them while studying for the exam.

Trade Show Mixer & Seed Issues Forum - This informal gathering is a great chance to see poster presentations of this year's research and ask questions. Take a minute to meet our sponsors and check out the trade show! Because of the open structure of this event, it's also an excellent opportunity to touch base with researchers and committee chairs if you want to get involved.

Bean Buddy Walk - The Bean Buddy Walk, sponsored by SoDak Labs, is a fun chance for members to enjoy the outdoors together and get your blood moving. Sign up early with your size to get your t-shirt!

Open Rules - The format of the Open Rules meeting in person has changed significantly compared to previous years. The primary Open Rules discussion now takes place virtually ahead of the meeting. This change was made to allow for more of the membership to attend Open Rules and to simplify the in-person duties of the Rules committee at the Annual Meeting. The update in person is a much shorter meeting focused on presenting any changes made since the virtual Open Rules meeting and giving voting members in person a chance to review the final text to be voted on during the business meeting.

Referee Presentations & Buzz Session - Referee presentations can cover a range of topics, typically involving multiple labs. These presentations may discuss training exercises, surveys, uniformity studies, round-robin studies, and method validation studies for new or revised methods. It's not uncommon for there to be ongoing research on a topic presented as well. Some rule proposals warrant collecting multiple years of data.

The Buzz Session is a chance to sit down with members in your region to discuss plans for upcoming research in the coming year. You don't have to have a complete plan for a project yet, if there's something you're keen to work on, partner with another analyst for help getting it going. The technical committees, Rules committee, Statistics committee, and Referee chairs are here to help! Don't worry, if you don't know what region you're in. There will be a map displayed at the meeting.

Research Presentations - Research presentations can cover a broad range of topics, and typically focus more on in-house projects involving developing technologies and methods, equipment trials, and ongoing genetic

research. The Seed Testing Research Foundation is available for those who need help funding their research.

Long Range Planning - All members, new and long-time, are encouraged to attend this meeting. Long Range Planning is where all the major topics to be voted on during the business meeting are presented and discussed. In order to keep the organization business meetings moving along, nothing can be voted on unless it has already been presented during Long Range Planning. One of the major topics being presented this year will be the consolidation of AOSA and SCST.

Group Photos, Silent Auction & Awards Banquet - Come looking crisp to the formal banquet and STRF Silent Auction. Proceeds from the silent auction go to support the Seed Testing Research Foundation to fund future research projects. The banquet is also the chance for new RSTs, CVTs, CPTs, RGTs, CGTs, or CSAs to be congratulated and recognized.

Joint & Individual Business Meetings—All members are encouraged to attend these meetings. For SCST members using the annual meeting for continuing education, attendance at the SCST business meeting is required to receive CE points. For voting members, this is the time to vote on the proposed changes to the Rules and any major business of the organization for the coming year. Committee Chairs will also present their reports on committee activities from the previous year.

Seed Industry Acronym & Abbreviations Primer

AASCO—Association of American Seed Control Officials
AASCO works toward uniform seed legislation and provides training for seed samplers.

AOSA—Association of Official Seed Analysts
The group of regulatory and state labs also working in seed testing and research. Many members of AOSA labs are also registered or certified SCST members.

AOSCA—Association of Official Seed Certifying Agencies
AOSCA works to establish credible standards of high quality seed for certification.

ASTA—American Seed Trade Association
As a trade organization ASTA advocates science and policy issues of industry-wide importance.

CFIA—Canadian Food Inspection Agency
The Canadian government agency which establishes regulatory requirements for import, export, and production standards for Canada. The CFIA lab in Saskatoon, SK is also an AOSA member lab.

ISTA—International Seed Testing Association
The international group of accredited labs which produce the ISTA rules. US Labs can also be ISTA accredited.

SCST—Society of Commercial Seed Technologists
Individual members working for private companies and non-AOSA labs in seed testing and research. SCST members can also work in AOSA labs.

Seeds Canada—The new Canadian seed industry organization, which includes seed certification, seed testing, and regulation.
Seeds Canada members can also be SCST members and some Canadian private seed testing labs are run by registered SCST members. Previously Canadian Certified analysts were part of CSAAC.

Genetic Technology Superworkshop

Zach Duray, Genetic Technology Committee

The SCST genetic technology committee held a Superworkshop February 12th-16th at the Iowa State University Seed Science Center in Ames, IA. Offered every two years, this workshop offers participants hands-on experience in learning about different disciplines of genetic seed testing while preparing for the RGT/CGT exams. Experts in genetic testing from across AOSA/SCST gave talks focused on different technologies for evaluating trait confirmation, adventitious presence, and genetic purity. Fifteen people attended the workshop.

Normal and abnormal seedlings presented at the workshop.

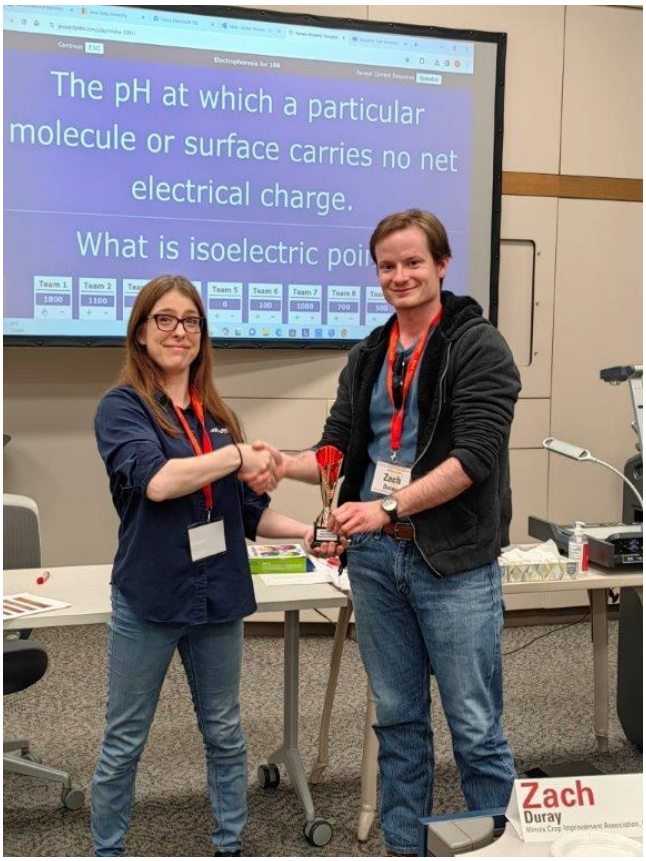
The first day of the workshop discussed basic molecular and cellular biology, plant breeding and genetics as well as classifying seedlings based on the AOSA rules. Understanding molecular genetics is fundamental to understanding and troubleshooting all areas of genetic testing, and as such, is a significant section of the RGT/CGT exam.

Day 2 of the workshop focused on herbicide bioassays, ELISA testing, and DNA extractions. Participants observed corn and soybean seed imbibition and rolled towel herbicide bioassay results from several different herbicides. They learned to identify key symptomology associated with seedling damage from specific herbicides compared to abnormal or underdeveloped seedlings. Participants learned about and performed ELISA testing on corn samples evaluating for BT-Cry protein presence and how to interpret results. Participants performed a procedure for isolating DNA from seed samples, learning about the key steps needed to maintain the integrity of template DNA for use in PCR reactions.

Day 3 of the workshop covered PCR, SNPs, sampling for AP and using SeedCalc for developing testing plans. Participants prepared a PCR mastermix following a pre-determined protocol. SNP testing was discussed in its use for identifying different varieties and allele distributions. An output from a SNP test was evaluated to identify homozygotes and heterozygotes within a population. Participants learned how to use SeedCalc to estimate levels of contamination in a sample, and the level of confidence associated with that estimate. The hands-on activity involved participants determining pool sizes and number of pools of a test sample to figure out how to best capture the estimated contamination level in the sample.

Day 4 of the workshop was devoted to gel electrophoresis. The pros and cons of different types of gel electrophoresis were outlined, showing the equipment involved such as gel rigs, molds, power supplies, and well combs. Participants sliced starch gels for isozyme testing and learned how to interpret zymogram results, evaluating a population of hybrid samples for genetic purity. Looking at banding patterns, participants learned how to distinguish a hybrid from a female self, an off-type, or a seed contamination.

During the final day of the workshop, participants reviewed material covered throughout the week, discussed the RGT/CGT exam, and competed against one another in a game of genetic-technology-themed Jeopardy. Zach Duray of Illinois Crop Improvement went home with the Jeopardy champion trophy. Attendees of the workshop received flash drives of all the presentations given throughout the week.



Genetic Technology Chair, Molly Richeson presenting winner Zach Duray with the Genetic Technology Jeopardy trophy.

The Genetics Superworkshop is a valuable opportunity for prospective RGTs and CGTs to earn continuing education points to qualify to take the RGT/CGT exam and to learn from experts in the seed industry. This workshop is beneficial for early-career professionals new to genetic seed testing, allowing participants to learn and develop technical knowledge. For experienced technicians, the workshop serves as a forum for refining knowledge, fostering collaboration and exchanging ideas on procedures and technology. Overall, this is a valuable networking opportunity for any individuals working in genetic seed testing.

Melissa Phillips, Kathy Mathiason, and Brent Reschly reconnected at the workshop between teaching units and taking photos.

A special thanks to Molly Richeson, the workshop speakers, and the genetic technology education sub-committee for organizing and presenting for the superworkshop, and Iowa State University for hosting the event.

Genetic Technology Superworkshop—Photos

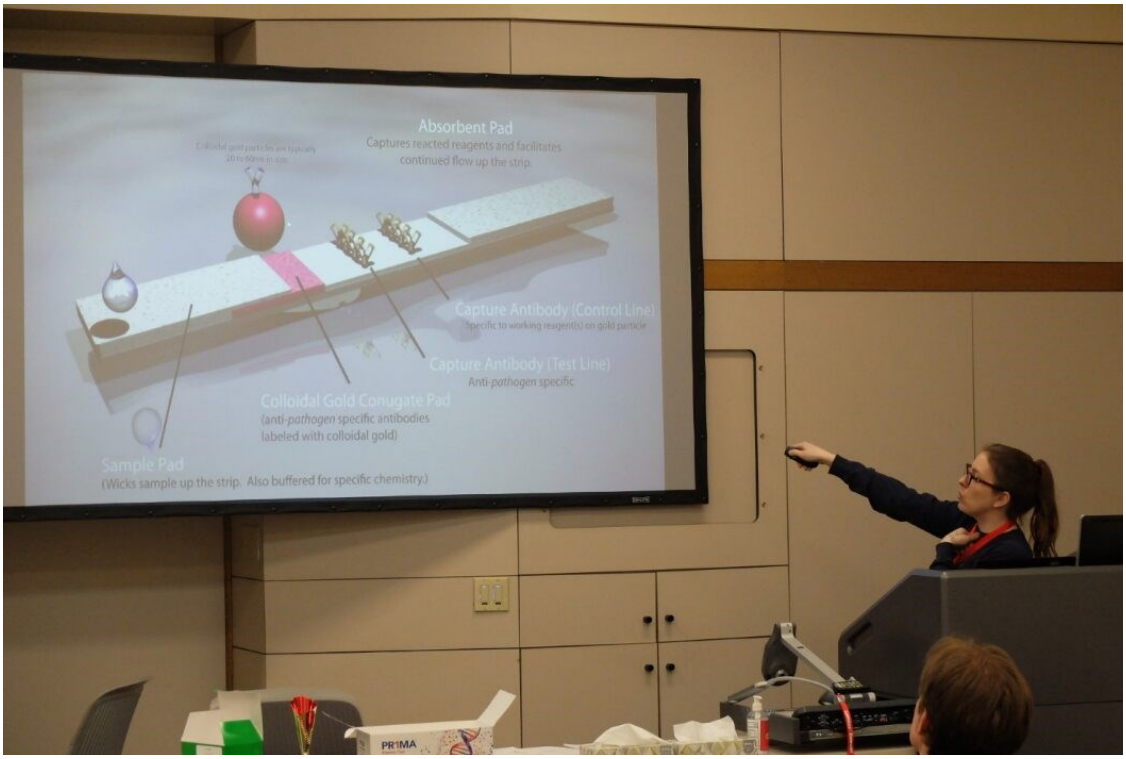
Photos submitted by Brent Reschly, RST

Genetic Technology Superworkshop attendees and organizers at Iowa State University. From left, Lauren Shearer, Chelsea Riley, Molly Richeson, Sam Banks, Kaitlin Houghtby, Kelly Grief, Mereida Fluckes, Zach Duray, Palloma Morais, Bhupinder Singh, Hunter Matthaei, Brandon Schiefelbein, Marina Zacharias. Many thanks to ISU for hosting the workshop and all the members of the Genetic Technology Committee who worked so hard to put together an informative and useful workshop.

Photo credit: seeds.iastate.edu

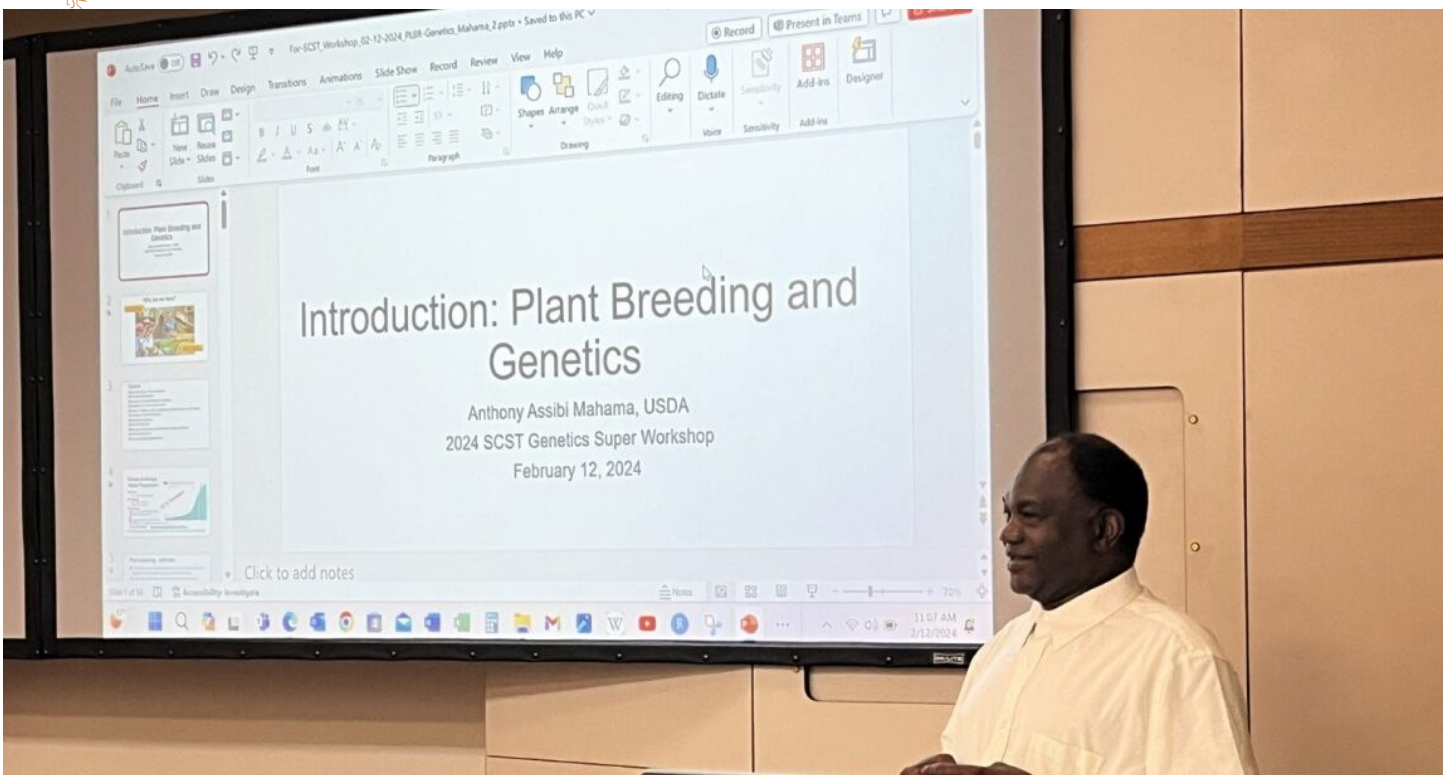
Dr. Brent Turnipseed, RST, SDSU Seed Laboratory, in professor mode teaching polyacrylamide gel electrophoresis.

Marina Zacharias and Mereida Fluckes, this preparing an ELISA set up during the workshop. Attendees were able to conduct many different hands-on training exercises in addition to attending lectures on the essential topics of genetic technology in seed testing.



Molly Richeson, RGT, Genetic Technology Committee Chair presenting a unit on lateral flow strips.

SCST President, Melissa Phillips, RST, CGT presenting on ways to troubleshoot herbicide bioassay tests.



Top: Anthony Assibi Mahama, USDA presented a unit introducing workshop attendees to the principles of plant breeding and genetics. Bottom: Hunter Matthaei and Bhupinder Singh evaluating an herbicide bioassay.

2024 SPRING WORKSHOP & PROFESSIONAL DEVELOPMENT EVENT

Dates
Tuesday, April 23rd
through
Friday, April 26th

Location
Chemeketa Community College
4000 Lancaster Dr NE, Salem, OR

Cost
$50
Per Day/Per Person

Highlights & Topics
- Cleaning, Sampling & Dividing
-Purity
-Germs and Reports of Analysis (ROA)
-What's the Difference (In Test Type)
-Forklift Recertification & Rodeo!

Featuring Guest Speakers
-Dave Stimpson, OSU
-Carl Laux, Papé
-Tim Clower, AMVT
-Nicole Anderson, OSU
-Kevin Ruby, Chemeketa
-Rachel Henricks, Henricks Seed Lab
-Jane Penrose, AgriSeed Testing
-Sharon Davidson , AgriSeed Testing

TICKET TYPES

Day 1 Ticket (Tuesday Only)
$50 per person

- ✓ Cost of Poor Quality Seed
- ✓ Moisture Levels, Swathing, and Combining
- ✓ Regrowth Hurdles in the Field
- ✓ Examples of Seeds that Look Good But Are Not
- ✓ Troubleshooting Combine Settings
- ✓ Why Is My Cleanout So High? Examples of Weeds/Seeds That Are Problematic
- ✓ Optical Sorters: Principles, Technolgoies and Applications

Day 2 Ticket (Wednesday Only)
$50 per person

- ✓ Proper Sampling Techniques Sampling Practice
- ✓ Dividing and Submitting Samples: Identifying and Building Reference Seed
- ✓ Purity 101: I Dropped My Sample Off At The Lab, Now What?
- ✓ Do Your Own Mill Checks

Day 3 Ticket (Thursday Only)
$50 per person

- ✓ TZ 101 - Correlation to Germinations
- ✓ Flourescence, the Other 'F' Word
- ✓ Decoating Coated Seed
- ✓ Interperting Reports of Analsysis
- ✓ AOSA/Canada/ISTA: What's the Difference, What Do I Ask For?
- ✓ Special Testing Requests for Market Access

Day 4 Ticket (Friday Only)
$50 per person

- ✓ Forklift Safety/Recertification
- ✓ Blocking and Bracing
- ✓ Forklift Rodeo

REGISTER TODAY: https://oregonseed.org/events/springevent/

OSA
OREGON SEED ASSOCIATION

Committee Updates

As submitted by committee chairs

Communications and Publications

The Communications and Publications Committee has had a busy year, putting together two issues of the Newsletter and working to coordinate with other seed industry organizations. Many thanks to Jordan Gregory, Tammy Stark, and Kaitlin Crawford from the ASTA Communications committee for helping to facilitate this ongoing effort.

The committee is continuing to work on an index of AOSA Newsletter, SCST Seed Technologist News, Seed Technologist Newsletter, and Annual Meeting Proceedings article topics. Thank you to Jon Collett for sending along the archives from the University of Kentucky. For those interested in cataloging some of the digital editions they can be found on the Historical Documents page of analyzeseeds.com. Anyone wanting to help with the indexing can include article information using a Google form, located here. Heidi Larson and Brent Reschly have a list of the missing issues, primarily issues of SCST publications from before 1948. If you think you may have a 'lost' issue of one of the Newsletters or Proceedings, please contact the committee.

Many thanks go out to the committee for providing articles, proofing, editing, photographs, and ideas for this issue.

Submitted by,
Quinn Gillespie, RST
Communications and Publications Committee—SCST Newsletter Editor

Conservation, Reclamation & Tree and Shrub Committee

Randy Crowl, RST from the Colorado State Seed Lab has accepted the position as chair of this committee. Thank you Randy! Members interested in this committee and in natives and wild species should reach out to Randy at Randy.Crowl@colostate.edu.

Cultivar Purity Committee News

In 2023 an updated version of the Cultivar Purity Handbook was released. This update contained refreshed material on Electrophoresis Testing as well as a new DNA Gender Testing of Hemp section and a few other refreshments. After publication if was noticed that a section seemed to be missing. AOSA Rules Volume 1,

Section 5.2.d refers to Nucleic acid assay methods for fluorescent ryegrass seedlings stating that "Testing protocols are included in the AOSA Cultivar Purity Testing Handbook, Contribution No. 33 to the Handbook on Seed Testing, AOSA, 2008, and subsequent updates." This method was not included the 2008 edition or any other version, and so the committee has been working on solving the mystery and incorporating this missing information. Meanwhile the sale of the Handbook was halted until this issue can be remedied. Those who purchased the updated 2023 edition will be able to get a new version once available at no charge. Revisions are in progress and the method is being included. Thank you to all who have helped to get the issue sorted out.

The Cultivar Purity Committee will hold its annual meeting as a joint committee meeting with the Genetic Technology Committee in Rapid City in 2024. We plan on discussing the possibility of joining the two committees as well as any new or old business. Bring your ideas of pros and cons or send to the committee in lieu of your attendance.

Submitted by,
Diandra Viner
Cultivar Purity Committee, AOSA Co-Chair

Genetic Technology Committee

Gen Tech had a Zoom meeting on 3-5-24 to debrief on the Genetics Superworkshop and to discuss what business we still need to finish up before the Annual Meeting. Putting on the Superworkshop was an achievement by the entire committee. All the hard work of everyone involved is greatly appreciated. Attendees received valuable information, skills, and made new professional relationships over the course of the workshop.

The registration was capped at fifteen participants. Brent Reschly took photos during the workshop and submitted them to the Communications and Publications Committee to be included in this issue of the Newsletter. After compiling the results of evaluations submitted by attendees the feedback is overwhelmingly positive. The results of the evaluations are available to the committee in the Teams folders and will be reviewed at the Annual Meeting. Molly Richeson is in contact with ISU about the financial aspect of the workshop and will get a budget report ready as soon as the money is delivered to SCST. Zach Duray of Illinois Crop Improvement went home with the coveted 2024 Genetics Superworkshop Jeopardy Champion trophy, and every attendee went home with a USB drive containing all presentations.

The Genetic Technology Committee meeting will be held in person, not virtually this year. Also, the meeting will be combined with the Cultivar Purity Committee. There is a possibility of the two committees combining. There has been a lot of thought put into committee consolidations across the organization, and we would like to discuss the pros and cons of committee consolidation with Cultivar Purity. The chairs of the Genetic Tech-

nology and Cultivar Purity committees have set aside time to discuss combining our annual meeting so the two groups can discuss together. I would like to spend some time at this meeting discussing our goals for 2024-25.

The Genetic Technology website subcommittee is focusing on reviewing the webpage for accuracy, outdated links and resources, and general maintenance. Kathy has done a great job of starting on this already and that document will be uploaded on the committee Teams page in the files section. The resources on the committee page need updating to ensure that the links and resources provided are of value to future members and prospective CGTs and RGTs.

The education subcommittee will review the most missed topics from the exam and see if any of these are suitable topics for a future webinar. As a reminder, webinar presenters are also eligible for continuing education points.

The newsletter subcommittee has submitted photos and a summary of the Superworkshop for the Newsletter and questions for the study guide portion of the Newsletter. Thank you Zach for writing the Superworkshop summary!

The research subcommittee has made significant progress on the herbicide bioassay virtual practical exam. It was mentioned that it may be beneficial to review some of these photos at the annual meeting for feedback on quality and clarity, but that won't be finalized until we decide on the agenda. Some feedback has been collected already, and the feedback is positive. Those interested are encouraged to contact Kalyn Brix.

Submitted by,
Molly Richeson, RGT
Genetic Technology Co-chair

Lab Standards and Documentation (Document Control)

The Laboratory Standards and Documentation committee is working to design a Document Control system for all AOSA/SCST committees. This will ensure continuity as committee members come and go. We are requesting that committee chairs submit SOPs describing the organization and functions of their committees. These will be placed on the committee webpages. Please visit the Laboratory Standards and Documentation Committee webpage for templates and guidance on writing the SOPs. SOPs can be submitted to Todd Erickson at todd.erickson@usda.gov

Submitted by,
Todd Erickson, USDA
AOSA Document Control Committee Chair

Proficiency Testing

This is a friendly reminder of the deadlines for the proficiency tests.

The genetic proficiency test deadline is **May 15th.** If you are a Registered or Certified member you are required to complete this proficiency test. Professional Members whose certification was on the genetic side are required to participate in one written proficiency test. If you have not participated in any yet this year, you are required to complete this one as well. Associate members are not required to participate but are highly encouraged to participate. If you did not receive an email, please reach out to Heidi Larson Heidi.larson@sgs.com.

The pelleted, coated, and encrusted proficiency test deadline is **May 17th.** If you are a Registered or Certified member with SCST you are required to complete this proficiency test. Professional members are required to participate in one written proficiency test. If you have not participated yet this year, you must complete this one. AOSA members are required to participate at the laboratory level. At a minimum one individual from each AOSA lab must participate. It is encouraged that all individuals within an AOSA laboratory participate. If you did not receive an email, please reach out to Jeanna Mueller jmueller@ndseed.ndsu.edu or Heidi Larson Heidi.larson@sgs.com.

Submitted by,
Jeanna Mueller (RST)
AOSA Proficiency Committee Chair

Heidi Jo Larson (RST)
SCST Proficiency Committee Chair

Referee Committee

The Referee Committee met March 8, 2024 to discuss presentations and projects for the 2024 Annual Meeting. It has been difficult to pull together referees in the past few years. Some of this may be due to the regional structure of the committee. Before the meeting Nishit Patel, Region 3 chair, commented that his region typically does not have many ongoing research projects due to a smaller membership. Marija Topic, Region 1, will be presenting on some uniformity studies conducted. She found good results with high uniformity between labs. She also has research in sweet corn root length to present. Nicolette Hard has received samples of basil seed for conducting referee testing focused on adding top of blotters as a method for basil seed germination testing. During an in-house study on the same lots Quinn Gillespie found that rolled towels produced very good results, as did top of blotters, with the current method of between blotters producing lower germination rates

compared to the other methods. Nicolette will be presenting some preliminary information on this study at the Annual Meeting. Anyone interested in participating should please contact Nicolette Hard at NicoletteHard@eurofinsus.com

Dr. Lei Ren, Region 6, will have a presentation on Kentucky bluegrass germinations. The deadline for those participating in this referee to send their data is May 4, 2024.

The committee has established a deadline of the end of May for referees to be presented at the annual meeting. For referee coordinators sending data to the Statistics Committee for analysis sooner is better than later.

The committee also discussed the future possibility of combining with the Research and Statistics committees, which would shift the structure from regional to working groups within the larger committee. This change would likely take place with consolidation. If the two committees are not consolidated a change to organizing by categories may still be beneficial to the committee and membership. In this case a change would be required in the AOSA Bylaws which defines the Referee Committee as organized by Regions and is the original location where the referee regions are described.

SCST Chair, Quinn Gillespie, strongly suggested that at the annual meeting during the hybrid session that a member of the committee or another volunteer log in to the virtual session to monitor A/V for any issues as this is very difficult for the presenter to monitor while still providing information. There were some issues during the presentations last year with the microphone dropping out mid-presentation. The closed Referee Committee meeting will be held over Zoom at which time the committee will set presentation order and timing and assign an on-site monitor for the hybrid meeting.

Submitted by,
Quinn Gillespie, RST
Referee Committee SCST Co-Chair

RGT Board of Examiners

The RGT BOE met on March 5th, 2024. There is at present a full board of examiners for the first time in several years.

The closed meeting will be in person, although there is the option to connect someone via Zoom if they are unable to attend in person. The RGT exams will be held in the afternoon on the Sunday before the Annual Meeting begins. Molly Richeson will be there to proctor the exam. Other members of the Board of Examiners can email Molly to coordinate proctoring schedules if they are interested.

Our annual meeting agenda this year will be simple. The RGT BOE will grade exams and set our goals for the

2024/25 year. Other members of the Board of Examiners are encouraged to voice their ideas and goals for the coming year. Members who are keepers of practical exams should look them over prior to the annual meeting to determine if more seed should be obtained. It is likely that the practicals are going to be needed this year.

Some ideas for goals that were brought up during the meeting include: practice exams, rewriting the existing exams one at a time, webpage revamp, document review, increasing exam prices, where/when to offer the second exam (Brookings, SD was volunteered), including SNPs as a testable technology, adding the new soybean herbicides to the exam, and if the HB virtual practical will be ready in time for use/what do we do if it's not and we need a practical. We aren't starting on any of this at our meeting, but we will discuss them and set what goals we will be tackling this year.

Submitted by
Molly Richeson
RGT Board of Examiners Chair

SCST Nominations Committee

The SCST Nominations Committee sent out a request for nominations for one board member position to be submitted by March 13, 2024. Three members agreed to serve if elected. Their profiles are included in this committee update. Nominee profiles are published as submitted.

Laura Carlson

Laura Carlson has a degree in Agri-Business and has more than 20 years of seed testing experience. She became an RST in 2004 and manages the germination and purity laboratories at SoDak in Brookings, SD. She is the SCST co-chair of the vigor committee. She instructs various training courses on seed sampling and testing through SoDak Seed Academy. She also assists in managing SoDak's quality management system for ISO17025 and ISTA accreditation.

Nicolette Hard

Nicolette Hard is a Registered Seed Technologist with a little over 20 years in the seed testing industry. Beginning her seed testing path as a student at the then BioDiagnostics, Inc, she had an initial knack for Seed Grading and seeking things that "don't belong". This found her starting directly in the purity department and then working her way up to Lab Manager in 2018. Nicolette is a whirlwind of energy and organization within the Standard Seed Testing department who challenges each of her 40 employees to do the best they can on a daily basis. Her passion for agriculture drives Nicolette to work as hard as possible to be an advocate in the industry (even to those who know absolutely nothing about what we, as seed analysts do). When Nicolette isn't in the lab, she enjoys playing with her dairy cattle, spending time with her family, and hiking with her dogs. Nicolette isn't afraid to speak her mind and question the status quo, which is why she would make a great asset to the Board of Directors.

Chase Mowry

I began this little seed testing journey at SGS in Brookings, SD, in the fall of 2012, and received my CVT in 2014. In 2016, I moved to St. Paul, MN, to work at Minnesota Crop Improvement Association (MCIA) as the lab was being reopened. In addition to seed testing, I also performed field inspections on various agronomic crops, natives, sod, and noxious weed seed-free forage and mulch. I received my RST in 2017, and in 2018 took on the role of the Seed Laboratory Manager. In 2020, the seed laboratory became accredited, and I took on the additional role of Quality Manager. In 2021, I became an accredited U.S. Seed Grader. I was also part of the AOSA/SCST Lab Report Audit working group in 2021/2022.

Submitted by,
Brad Johnson
SCST Nominations Committee Chair

2024 Teaching and Training Committee News

June 2 -6, 2024 AOSA/SCST annual meeting

This year's annual meeting will be held in Rapid City, South Dakota. The Teaching and Training session will be on Monday, June 3rd in room Salon D from 1:30- 3:30 pm. During this session the AOSA/SCST/ISMA Digital reference for Seed ID on the exam list will host a joint training project.

Webinars

The training and education webinars are uploaded and active on the website for viewing at

AOSA / SCST Teaching and Training – Analyzeseeds

An analyst can obtain Continuing Education points for watching the replays of these webinars if their supervisor or upper management signs and send the appropriate form to the CE committee. If anyone is interested in presenting a webinar, please send your topic for approval. Once approved, then a date and time will be coordinated with the webinar committee, and a notice will be sent out for others to register to attend.

Seed Schools and Workshops

- If attending a seed school or workshop, look periodically on the website for a list of dates and times throughout the year. Contact the host site for additional details.
- If hosting a seed school or workshop, please submit your agenda to the Continuing Education committee chairs in a timely manner to assign the appropriate CE points.

Reminders

All laboratories and/or analysts, please submit any new seed testing issues to the Teaching & Training committee chairs and we will forward them to the Executive board for discussion.

Submitted by:

Anitra Walker, Botanist, USDA, CSA

AOSA Teaching & Training Committee Chair

Cautions about Noxious Weed Determinations

Quinn Gillespie, RST

The topic of "what makes a noxious weed," came up during the Northwest Analysts meeting in January 2024. An incident was discussed, regarding how different regulatory officials may interpret their state seed laws and noxious weed laws. States maintain a noxious weed seed list, which USDA uses to populate the All-States Noxious list we are all familiar with. However, state departments of agriculture also maintain a noxious weed list, which may differ from the state noxious weed seed list referenced in the All-States list. These species are typically considered invasive, toxic, or economically harmful.

The example given was of a shipment of seed in Montana during summer 2024, which was contaminated with *Ventenata dubia,* a species that was not, at that time, listed on the Noxious Weed Seed list for the state of Montana. However, that species does appear on the Montana Noxious Weed list, and a regulatory official determined the contaminant to be a noxious weed where it had not been reported on a report of analysis looking for Montana-only noxious weed seeds. This species has since been added to the All-States Noxious list compiled by USDA, as of the January 2024 update.

Ventenata dubia, with characteristic twisted awns. Photo credit Matt Lanvin, Bozeman, MT, 2008.

Here in Oregon, the Noxious Weed list refers specifically to plants which have been designated noxious by the Oregon State Weed Board. A quick scan of the listing shows that the OSWB has a number of species listed which do not appear anywhere in the All-States Noxious Weed Seed list. This is the case for many other states as well.

These differences in the two listings don't mean that the All-States Noxious Weed Seed list is inaccurate or unreliable, rather that states may categorize mature plants and seeds differently, and that analysts may need to look beyond the All-States list for a more comprehensive list of potentially noxious species when the seeds crop up in our samples in the lab. At the federal level Noxious Weed Assessments are conducted through USDA-APHIS, using a science-based approach that considers the published literature, germination needs, risk factors, and potential for invasiveness of species of concern. This rubric provides a basis to classify noxious weed plants based on their risk level and may provide guidance for resource management to deal with harmful species in an efficient manner, whether it be through caution, quarantine, or extermination. Some species which

meet the baseline criteria to be considered noxious per the USDA-APHIS guidelines may include species that require very specific criteria to germinate, are slow growing, don't compete with local flora, or present a much lower threat when found as a seed. Some species may meet a higher criterion per their NWA due to concerns of toxicity and economic damage outside of the seed trade industry. In both cases, analysts are unlikely to find those species listed among our more familiar nemeses on the All-States Noxious Weed Seed list or in the state noxious weed seed lists.

The caution for analysts comes when regulatory officials or legislators do not make a distinction between a state noxious weed and a noxious weed *seed.* Seed analysts are encouraged to be aware of the potential for a contaminant to be identified as noxious based on state weed lists which may be administered separately of the state seed law. This is a caution repeated in Volume 3 of the AOSA Rules which also refers analysts to the USDA-APHIS listing for Federal Noxious Weeds. In cases where an analyst finds a weed seed which may be listed as noxious weed, they are advised to contact their department of agriculture weed board or USDA-APHIS for assistance when it is not clear how a seed belonging to a noxious weed but not found on the All-States list or in state seed law should be reported. Even in cases where the seed found can be verified as a non-noxious weed seed by the recipient state department of agriculture, it may be beneficial to list it under other determinations or comments when found during the course of a noxious exam. It is our job as analysts to do our due diligence in reporting as completely and accurately as possible during any examinations conducted in our labs, but there are always additional resources available for help when we get stuck.

For updates of the Federal Noxious Weed List, contact:
Anne LeBrun
4700 River Rd. Unit 26
Riverdale, MD 20737
Phone: 301-851-2259
Email: Anne.Lebrun@usda.gov
WebPage: https://www.aphis.usda.gov/aphis/ourfocus/planthealth/plant-pest-anddisease-programs/pests-and-diseases

Additional information regarding potentially noxious or prohibited species in other countries can also be found on the USDA-APHIS Phytosanitary Certificate Issuance and Tracking system (PCIT.) This website requires a USDA eAUTH login and provides useful information on prohibited species, insects, disease, fungal bodies, and inspection requirements for many different countries.

Web Page: https://pcit.aphis.usda.gov/pcit/faces/signIn.jsf

Hidden Contaminants in Lactuca sp. and Lolium spp.

Sunita Young, Quinn Gillespie, Diandra Viner

Digitaria sanguinalis in *Lactuca sativa*

Pictured: 6 seeds of Lactuca sativa (left), 5 seeds of Digitaria sanguinalis (right)

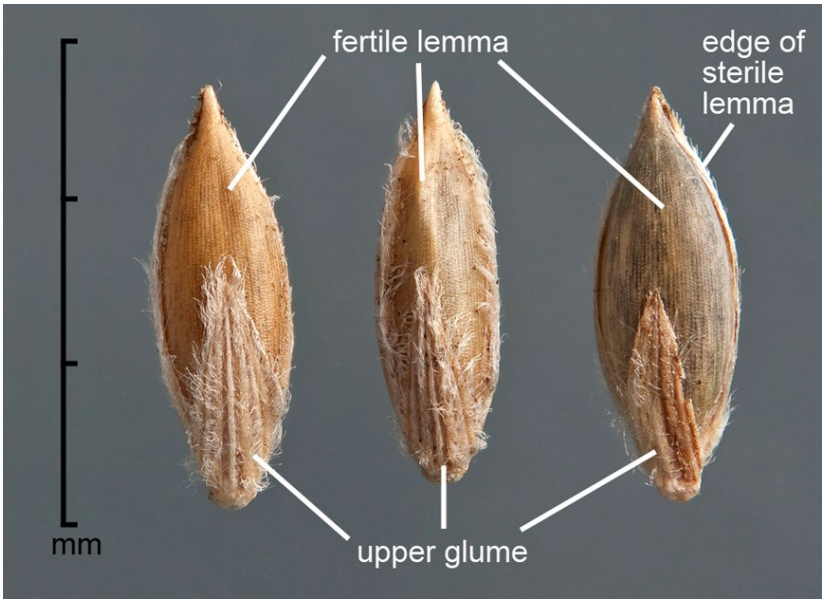
Purity cautions

Analysts are cautioned to used a microscope or other sufficient magnification when examining samples of lettuce seed due to the possible similarity with *Digitaria sanguinalis.* Especially considering the variability in color of *Lactuca sativa* seeds the two species may at first appear to be very similar. When viewed from the ventral side *Digitaria sanguinalis* has a sterile lemma with three central veins which can appear similar to the veins of *Lactuca sativa* present in seeds. *Digitaria sanguinalis* is noxious in the state of Nevada.

Identification tips

Digitaria sanguinalis is typically smaller than most *Lactuca sativa* seeds, and when viewed from the ventral side often retains the lower glume, visible in the photo above. *Digitaria* also only has three central veins on the sterile lemma which are evenly spaced, where lettuce seeds have many more ribs extending from the point of attachment and fanning out to the apex of the seed.

From the dorsal side the fertile lemma of *Digitaria sanguinalis* may appear hard and smooth. The fertile lemma of *Digitaria* seeds may also be darker than the sterile lemma and often retains some portion of the pubescent upper glume. The seeds may also retain a short pedicel at the base of the seed. *Digitaria sanguinalis* is elliptic, compared to seeds of *Lactuca sativa* which are oblanceolate (leaf shaped, narrowing at the base of the seed toward the point of attachment.) Lettuce seeds may retain a short pappus at the apex and have a somewhat thickened point of attachment at the base of the seed.



Dorsal view of *Digitaria sanguinalis. Photo: Walters, 2011.*

The caryopsis of *Digitaria sanguinalis* is largely elliptical with most of the caryopsis consisting of

endosperm and a smaller embryo typical of the structure of other poaceae species at the base. In *Lactuca sativa* the embryo is the entire interior of the seed with a delicate radicle at the basal end and cotyledons at the apex of the seed. Typically the embryo of *Lactuca sativa* is not visible unless the seed coat is severely damaged.

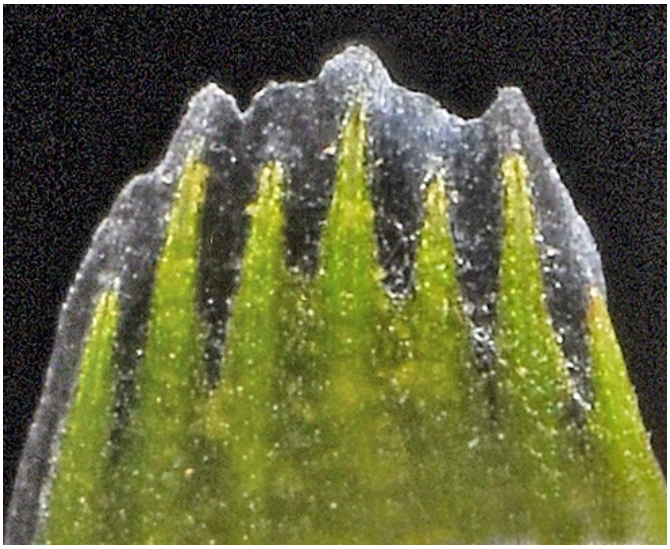
Glyceria spp. in *Lolium spp.*

Pictured: Four seeds of *Lolium spp.* (left) and four seeds of *Glyceria spp.* (right)

Purity cautions

Due to the similarity with so many other grass species, analysts are cautioned to always examine samples of *Lolium spp.* with sufficient magnification. *Glyceria spp.* seeds can appear very similar to other grass species, particularly perennial ryegrass which tends to be much smaller than annual ryegrass. The seeds are similar in color and shape and may not be distinguishable without a microscope or hand lens. *Glyceria* contaminants may also be indistinguishable from other species of *Glyceria* without genetic, ploidy, or grow-out tests. Identification. Among *Glyceria spp. Complex* species it is possible to narrow down individual species using ploidy analysis by flow cytometry with final identification made using grow out (Garay, 2007.)

Of the four similar *Glyceria* species, *Glyceria fluitans* and *Glyceria declinata* are permitted in seeds exported to Australia, where *Glyceria occidentalis* and *Glyceria leptostachya* are prohibited. *Glyceria* is a common weed in many areas of grass seed production which do export to Australia, so precise identification is important whenever possible.



Immature *Glyceria declinata* lemma with ends of veins, lobes, and papery webbing visible. Photo: Gerald D. Carr, 2022. Used with permission.

Identification tips

The lemma of *Glyceria spp.* has very distinctive veins extending from the callus to the apex. The apex of the lemma is lobed or crenulate and can have a "webbed" appearance in immature seeds, which dries to become fine and papery, extending beyond the lemma veins in some species. The lemma of *Lolium spp.* is typically smooth and glabrous with blunted apices which may or may not include an awn and minute hairs or teeth along the edge visible in the ventral view. In comparison to the glossy lemma of *Lolium spp.* the lemma of *Glyceria spp.* is minutely hispid or scabulous and can appear grainy under magnification.

The palea of *Glyceria spp.* is smoother than the lemma and often have a somewhat "potbellied" appearance. The palea may also be slightly translucent with the dark caryopsis inside visible. The palea of *Lolium spp.* tends to fit closely to the flattened elliptical caryopsis. In *Lolium spp.* the palea often also have deeper fold or crease in the center which is less commonly found in *Glyceria spp.*

Two of the most easily distinguishable features of *Lolium spp.* And *Glyceria spp.* are the rachillas and caryopses. The rachilla of *Glyceria spp.* is peg-shaped, with a slightly flared tip, similar to a golf-tee or the rachilla found in Tall fescue (*Festuca arundinacea*). In *Lolium sp.* the rachillas are distinctively flattened, shiny, and rectangular, echoing the flattened shape of the callus. The caryopses of these two species are very distinct from one another. The caryopsis of *Lolium sp.* Is generally elliptical, slightly flattened toward the apex, and often somewhat roughened texture. The caryopses of *Glyceria spp.* are typically dark brown and glossy and roundly ovoid.

Glyceria striata (Chakya, 2015) and Lolium perenne (Walters, 2011) caryopses.

References:

Australian Government Department of Agriculture, Fisheries, and Forestry. (2024, March 22). Import questions. Case: Permitted seed for sowing. BICON. https://bicon.agriculture.gov.au/ImportConditions/Questions/EvaluateCase?elementID=00000068166&elementVersionID=682

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Chayka, K. (2015). *Glyceria striata (fowl manna grass)*. Minnesota Wildflowers. https://www.minnesotawildflowers.info/grass-sedge-rush/fowl-manna-grass

Garay, A. (2007) Update on Glyceria (Mannagrass) Identification at the OSU Seed Laboratory. Oregon State University Seed Laboratory. https://seedlab.oregonstate.edu/sites/seedlab.oregonstate.edu/files/update-on-glyceria-mannagrass-identification-2007.pdf

Walters, D.S. (2011). Identification Tool to Weed Disseminules of California Central Valley Table Grape Production Areas. USDA APHIS PPQ CPHST Identification Technology Program, Fort Collins, CO. http://idtools.org/id/table_grape/weed-tool/ 2024.

Young, Sunita (2024) Lactuca sp. and Lolium sp. [Images], Minnesota Department of Agriculture.

2024 Rule Change Proposals

As submitted to the AOSA Rules Committee

Proposal No.	Purpose	Submitted by
1	Add PSU definition and working weights for Trifolium michelianum Savi, Balansa clover to the AOSA Rules for Testing Seeds. The species will only be added to AOSA Rules Volume 1 Table 2A.	Rachel Henricks, RST, Henricks Seed Lab
2	To adjust the working weights for the purity analysis of sorghum (*Sorghum bicolor subsp. bicolor*) and sorghum-sudangrass (*Sorghum bicolor nothosubsp. drummondii*) in Table 2A.	Tyann Alexander, RST, SGS
3	To clarify the minimum working sample weights for noxious weed seed and bulk examinations for kinds in Table 2A with minimum working sample weight for purity analysis but none stated for noxious weed seed and bulk examinations.	Deborah J. Lionakis Meyer and Nishit Patel, AOSA-SCST Purity Subcommittee.
4	Adding organic growing media (O) as an optional/ alternative method for testing of field and garden pea (*Pisum sativum*)	Kaitlin Houghtby, RST, Bayer Crop Science
5	To clarify when the numbers of seeds found of other cropseeds and weed seeds are stated on the Report of Analysis.	Deborah J. Lionakis Meyer and Nishit Patel, AOSA-SCST Purity Subcommittee.
6	To amend species class and contaminating classification for *Trifolium michelianum* (Big-flowered) and to add the common name balansa clover in AOSA Rules Volume 3. Uniform Classification of Weed and Crop Seeds.	Rachel Henricks, RST, Henricks Seed Lab
7	To reclassify the species class of *Thelesperma filifolium* to Flower (F) and Range (R) in the AOSA Rules for Testing Seeds Volume 3, and to change the "contaminating classifications" to crop based on the usage of this genus, since it is sold as reclamation and wildflower seed in commerce.	Sarah Schulthies, UDAF Seed Lab, Terry Freeman, UDAF Seed Lab
8	To add *Bromus riparius Rehmann* × *B. inermis* Leyss., hybrid bromegrass, to Volume 3.	Deborah J. Lionakis Meyer and Nishit Patel, AOSA-SCST Purity Subcommittee.

9	To correct the common names for various species of *Galium* in Volume 3 of the AOSA Rules.	Deborah J. Lionakis Meyer and Nishit Patel, AOSA-SCST Purity Subcommittee.
10	To improve the definitions of the species classifications in AOSA Rules Volume 3.	Deborah J. Lionakis Meyer and Nishit Patel, AOSA-SCST Purity Subcommittee.
11	To correct the common names for various species of *Phacelia* and *Plagiobothrys* in Volume 3 of the AOSA Rules.	Deborah J. Lionakis Meyer and Nishit Patel, AOSA-SCST Purity Subcommittee.
12	To add Asteraceae family - Flower seedlings with tall hypocotyls – ex. *Tagetes spp.* Marigold	Sarah Dammen, RST, SGS

Please submit comments on AOSA Rule Proposals on the Rules Committee page or contact the AOSA Rules Committee. The text of all proposed rules is printed as submitted by the authors and approved by the AOSA Rules Committee. Where possible supporting evidence has been provided. In some cases supporting evidence has been truncated for formatting reasons. Additional supporting evidence can be viewed on the AOSA Rules Committee website.

2024 AOSA Rule Proposals

As published by the AOSA Rules Committee

2024 Rule Proposal #1

Purpose of Proposal: Add PSU definition and working weights for Trifolium michelianum Savi, Balansa clover to the AOSA Rules for Testing Seeds. The species will only be added to AOSA Rules Volume 1 Table 2A.

Present Rule: New Rule; Not in the AOSA Rules for Testing Seeds Volume 1.

Proposed Rule:

Pure Seed #	Chaffy Seed	Kind of seed	Minimum weight for Purity analysis	Minimum weight for noxious-weed seed or bulk examination	Approximate number of seeds per gram	Approximate number of seeds per ounce
2		Trifolium michelianum Savi clover, balansa; clover, big-flowered	2.4	24	1,091	30,936

Harmonization/Impact statement:
This species is not currently listed in the Federal Seed Act Regulations or the Canadian Methods and Procedures for Testing Seeds. The International Rules for Seed Testing include T. michelianum Savi in Table 2C Part 1; Purity analysis weight of 2 grams and other seeds by number weight of 20 grams.

Supporting Evidence: Table 1 – Seed counts

	Kind: Balansa clover															
Year	Species: T. michelianum															
	Lab #	rep 1	rep 2	rep 3	rep 4	rep 5	rep 6	rep 7	rep 8	Mean	Variance	STDEV	CoVar	seeds/#	seeds/gram	purity wt.
2020	47953	0.0865	0.0831	0.0808	0.0841	0.0851	0.0867	0.0858	0.0791	0.0839	7.56857E-06	0.002751	3.279027	540643.6	1191.895113	2.098
2020	51059	0.0925	0.0957	0.0927	0.0892	0.0859	0.0912	0.0877	0.0901	0.090625	9.585E-06	0.003096	3.416237	500524.1	1103.448276	2.266
2020	51062	0.0918	0.0845	0.0916	0.0957	0.0896	0.0893	0.0896	0.0907	0.09035	9.83714E-06	0.003136	3.471413	502047.6	1106.806862	2.259
2020	51063	0.0980	0.0980	0.0948	0.0968	0.0973	0.1015	0.1012	0.1005	0.098513	5.54411E-06	0.002355	2.390146	460449.2	1015.099607	2.463
2020	51165	0.1127	0.1120	0.1139	0.1136	0.1096	0.1109	0.1093	0.1102	0.111525	3.19357E-06	0.001787	1.602382	406724.9	896.6599417	2.788
2020	51656	0.0949	0.0938	0.0941	0.0934	0.0955	0.0960	0.0944	0.0973	0.094925	1.66786E-06	0.001291	1.360501	477850.9	1053.46326	2.373
2020	51657	0.0877	0.0937	0.0898	0.0910	0.0907	0.0901	0.0861	0.0901	0.0899	5.09429E-06	0.002257	2.510626	504560.6	1112.347052	2.248
2020	51658	0.0894	0.0891	0.0882	0.0904	0.0875	0.0940	0.0890	0.0886	0.089525	3.99643E-06	0.001999	2.233015	506674.1	1117.006423	2.238
2020	51659	0.0937	0.0962	0.0945	0.0945	0.0994	0.0970	0.0957	0.0929	0.095488	4.28411E-06	0.00207	2.167622	475036	1047.257494	2.387
2020	51660	0.0838	0.0904	0.0896	0.0927	0.0867	0.0901	0.0909	0.0909	0.089388	7.93839E-06	0.002818	3.152024	507453.5	1118.724654	2.235
2020	51725	0.1099	0.1127	0.1106	0.1133	0.1147	0.1124	0.1129	0.1169	0.112925	4.85357E-06	0.002203	1.950925	401682.5	885.5435023	2.823
2021	54307	0.0813	0.0802	0.0836	0.0832	0.0882	0.0841	0.0851	0.0810	0.083338	6.69696E-06	0.002588	3.105264	544292.8	1199.940003	2.083
2021	54308	0.0865	0.0825	0.0853	0.0835	0.0893	0.0841	0.0825	0.0852	0.084863	5.18268E-06	0.002277	2.682633	534511.7	1178.376786	2.122
2015	AGRI	0.0990	0.1030	0.1000	0.0980	0.1020	0.1030	0.1000	0.0980	0.100375	4.26786E-06	0.002066	2.058161	451905.4	996.26401	2.509
2022	67544	0.1090	0.1076	0.1098	0.1097	0.1055	0.1087	0.1037	0.1036	0.1072	6.68E-06	0.002585	2.410979	423134.3	932.8358209	2.68
2022	68714	0.0825	0.0805	0.0804	0.0828	0.0786	0.0793	0.0792	0.0796	0.080363	2.38554E-06	0.001545	1.921939	564442.4	1244.361487	2.009
2022	68563	0.0766	0.0796	0.0737	0.0791	0.0715	0.0740	0.0742	0.0738	0.075313	8.10982E-06	0.002848	3.781278	602290.5	1327.80083	1.883
2022	68564	0.0813	0.0889	0.0888	0.0901	0.0860	0.0866	0.0883	0.0848	0.08685	8.06571E-06	0.00284	3.270029	522279.8	1151.410478	2.171
2022	66548	0.0987	0.099	0.0958	0.098	0.0893	0.0953	0.0917	0.0917	0.0949	1.33798E-05	0.003658	3.852897	477788	1053.324556	2.373
													Average	494,963	1,091	2.4
														Seeds per ounce:		30,936

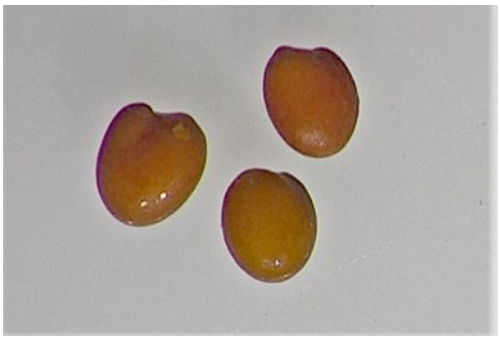
Avg. 2,500 seed weight = 2.4 grams Avg. 25,000 seed weight = 24 grams
Table 1 is a result of a survey of laboratories. 2 laboratories participated.

The raw data was analyzed by Dr. Sabry Elias of Oregon State University and AOSA chair of the Statistics

Committee. Results show a purity weight of 2.4 grams and a bulk exam weight of 24 grams.

Pure Seed Unit numbers 2 and 9 are suitable for legumes. A Pure Seed Unit of 2 is recommended for T. michelianum as it is generally marketed as seeds without the pod intact.

Seed unit:



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Phone: 541-369-2236 Fax: 1-541-636-2451 email: Rachel.henricks@gmail.com

Date Submitted: 10/5/2023

Summarized seed count data is included on following pages. For complete listing of seed counts analyzed, supporting evidence is available on the Rules Committee website or download here: Purity Weight Workbook

Supporting Evidence for Rule Proposal #1, from Purity/Bulk/Noxious Weight Calculator developed by Statistics & Purity Committees

D

D1. For each seed lot, enter the average purity weight calculated in either B5 or C5 without further rounding.

D2. Check the CV. The CV should not exceed 10% for either chaffy or non-chaffy kinds. If the CV is greater than 10%, single reliable estimates of minimum purity and bulk/noxious weed weights cannot be calculated based on the sampled seed lots.

D3. The average purity weight from all lots is calculated. *Do not use this value when proposing an addition/change to Table 2A of the Rules, vol. 1 (2022).*

D4. The **Minimum Purity Working Weight (g)**, derived from the value in D3, is calculated without rounding. This value is the upper limit 95% confidence interval for the mean calculated in D3. Results must be rounded to the correct number of decimal places, as described in sec. 13.4b.1 of the rules, vol. 1 (2022) and section IV.4 of the instructions, before inclusion in Table 2A of the rules.

D5. Manually enter the correctly rounded mean from D4 in the provided field. *This is the value to be proposed for addition to Table 2A of the rules .*

D6. The minimum bulk/noxious weed weight for inclusion in Table 2A is automatically generated.

Before a new analysis for a different species, make sure to clear the data entered under A, B1, B4, C4, D1 and D5.

D1. Average purity weight for each seed lot

Lot No.	ID	Calculated purity weight (g)
1	47953	2.0975
2	51059	2.265
3	51062	2.26
4	51063	2.4625
5	51165	2.7875
6	51656	2.3725
7	51657	2.2475
8	51658	2.2375
9	51659	2.3875
10	51660	2.235
11	51725	2.8225
12	54307	2.0825
13	54308	2.1225
14	AGRI	2.51
15	67544	2.68
16	68714	2.01
17	68563	1.8825
18	68564	2.1725
19	66548	2.3725
20		

D2. CV (%):	10.9
D3. Mean purity weight	2.3162
D4. Unrounded Minimum Purity Working Weight (g):	2.41661
Minimum purity weight rounded to 2 decimals:	2.42
Minimum purity weight rounded to 1 decimal:	2.4
Minimum purity weight rounded to whole number:	2
D5. Minimum Purity Working Weight (g):	2.4
D6. Minimum bulk/noxious weed weight (g):	24

For complete listing of seed counts analyzed, supporting evidence is available on the Rules Committee web-site or download here: Purity Weight Workbook

2024 Rule Proposal 2

PURPOSE OF PROPOSAL: To adjust the working weights for the purity analysis of sorghum (*Sorghum bicolor* subsp. *bicolor*) and sorghum-sudangrass (*Sorghum bicolo*r nothosubsp. *drummondii*) in Table 2A.

PRESENT RULE:

Table 2A. Weights for working samples

Pure Seed Unit #	Chaffy (C) or Super Chaffy (SC)	Kind of seed	Minimum weight for purity analysis	Minimum weight for noxious weed seed or bulk examination	Approximate number of seeds per gram	Approximate number of seeds per ounce
15		*Sorghum bicolor* (L.) Moench subsp. *bicolor* sorghum (incl. grain, sweet, and forage cvs.)	50	500	30-80 (55)	850-2,270
15		*Sorghum bicolor* (L.) Moench nothosubsp. *drummondii* (Steud.) de Wet ex Davidse sorghum-sudangrass, shattercane	65	500	38	1080

PROPOSED RULE:

Table 2A. Weights for working samples

Pure Seed Unit #	Chaffy (C) or Super Chaffy (SC)	Kind of seed	Minimum weight for purity analysis	Minimum weight for noxious weed seed or bulk examination	Approximate number of seeds per gram	Approximate number of seeds per ounce
15		*Sorghum bicolor* (L.) Moench subsp. *bicolor* sorghum (incl. grain, sweet, and forage cvs.)	70	500	25-82 (37)	709-2324 (1055)
15		*Sorghum bicolor* (L.) Moench nothosubsp. *drummondii* (Steud.) de Wet ex Davidse sorghum-sudangrass, shattercane	70	500	29-59 (41)	822-1673 (1170)

HARMONIZATION/IMPACT STATEMENT:

Since there is no adjustment to the noxious examination weight, in most instances, this will not change the weight that needs to be submitted for lab testing.

The purity testing weights for the other testing rules are as follows:

	ISTA	**Canada M&P**	**FSA**
Sorghum	90 g	50 g	50 g
Sorghum-sudangrass	30 g	50 g	65 g

Due to variety of weights used between these two species, harmonization is difficult. This proposal does utilize a higher weight in all instances above except for ISTA sorghum.

SUPPORTING EVIDENCE:

The use of *Sorghum bicolor* is wide. Sorghum species are used as forage, ethanol product, birdseed, cereal grain, and syrup. Due to the nature of commercialized seed varieties available, it appears that the seed size of Sorghum species has adjusted over the years. Most commercial varieties of Sorghum species are trending to be hybrids (crossing of two parents) with the intention of creating more vigorous, uniform, and higher quality production (FAO 1995). Depending on the nature of the parents' lines used in this cross, the sorghum seeds can be quite large. It appears from the count evidence presented, that a 50 gram purity for *Sorghum bicolor* is usually falling much short in reaching 2500 seeds.

Sorghums and sudangrass hybridize freely, resulting in mixed genetics unintentionally in the past (Wheeler 1950, p 654). Efforts to cross sorghums and sudangrasses started in the 1930s to increase forage quality and reduce disease (Hughes et al. 1953). In these crosses of sorghum-sudangrass, the offspring tends to take on the characteristics of the mother plant, which could be either sorghum or sudangrass or subsequent generations of a hybrid of the two (Schmidt et al. 2018).

It appears to be increasingly difficult to determine the genetics of the sorghum species visually. The language of what is a hybrid sorghum, or a sorghum-sudangrass isn't always clear in samples received from the industry, as both types are often used for forage and the terms are sometimes used interchangeably.

Other large crop species in the AOSA Rules for Testing Seed, such as *Zea mays* and *Helianthus annuus*, utilize common working weights to account for all cultivars or varieties submitted for testing, even though the seed size and uses can be quite diverse among types. This rule proposal intends to use a similar approach taken with other cereal crops to ease the processing of these two sorghum species in a laboratory setting.

The Region 2 Referee Committee has discussed at the last two annual meetings about the same issues some labs were having about the types of sorghums received in the lab. We sought volunteers to help with creating supporting data for this proposal. Data was obtained from 6 different labs who submitted count data from samples in their lab.
Seed counts were performed using the Non-Mechanical Seed Count method as described in Section 13 of the

Volume 1 of the *AOSA Rules for Testing Seeds*. Counts were performed on 41 samples of sorghum and 41 samples of sorghum-sudangrass. The sorghum samples were 12 forage types, 23 grain types, and 6 unknown, miscellaneous or multi-purpose use types. At least three of the samples were open-pollinated types. At least seven states/regions are represented in the sample set from at least 12 different sources. This produced a wide range of samples received from many different areas of the industry and the United States. The averages of all the counts were compiled below.

	# of samples	Mean of 100 seed reps (g)	Average seeds per gram	Mean purity weight (g)	Range of working weights (g)	Unrounded Working Weight Average*
Sorghum	41	2.838	37.21	71.69	30-99	76.95
Sorghum-sudangrass	41	2.499	41.29	62.48	42-84	66.99
		2.683	39.25	67.09		71.98

*This number based of the AOSA/SCST Statistics Committee *Purity Weight Calculator* using count data from 40 samples for each species

To see the full data, refer to the attached excel document.

SUBMITTED BY:
Tyann Alexander, RST
tyann.alexander@sgs.com

DATE SUBMITTED: October 2, 2023

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Seed count data included on subsequent pages. For complete Seed Count Purity Weight calculation worksheet please view on Rules Committee webpage or download here: Purity Weight Workbook

Rule Proposal #2 Supporting Evidence

Sample #	1	2	3	4	5	6	7	8	mean	stdev	c.o.v.	seeds/g	meanx 25	Lab #	
A1	2.196	2.208	2.193	2.169	2.186	2.214	2.215	2.189	2.196	0.015	0.667	45.532	54.906	1	
A2	1.596	1.586	1.542	1.569	1.615	1.565	1.596	1.585	1.582	0.021	1.334	63.221	39.544	1	
A3	3.169	3.153	3.126	3.192	3.136	3.119	3.008	3.102	3.126	0.052	1.662	31.994	78.141	1	
A4	3.324	3.337	3.450	3.348	3.348	3.356	3.381	3.395	3.367	0.038	1.124	29.697	84.184	1	
A5	3.533	3.530	3.481	3.479	3.510	3.513	3.401	3.480	3.491	0.040	1.137	28.646	87.272	1	
A6	2.936	2.861	2.793	2.773	2.833	2.805	2.761	2.875	2.830	0.055	1.945	35.340	70.741	1	
A7	3.622	3.809	3.739	3.778	3.562	3.738	3.772	3.820	3.730	0.085	2.291	26.810	93.250	1	
A8	3.037	3.019	3.011	3.000	2.956	3.095	2.918	2.963	3.000	0.051	1.704	33.335	74.997	1	
A9	3.236	3.231	3.152	3.274	3.282	3.253	3.094	3.199	3.215	0.060	1.872	31.103	80.378	1	
A10	3.615	3.598	3.525	3.519	3.402	3.451	3.509	3.513	3.517	0.065	1.851	28.437	87.913	1	
A11	2.784	2.739	2.759	2.753	2.836	2.717	2.754	2.708	2.756	0.038	1.365	36.281	68.906	1	
A12	3.304	3.104	3.146	3.265	3.175	3.106	3.169	3.276	3.193	0.073	2.296	31.317	79.828	1	
A13	3.137	3.140	3.213	3.088	3.142	3.160	3.191	3.128	3.150	0.036	1.145	31.747	78.747	1	
A14	2.390	2.404	2.452	2.511	2.470	2.479	2.467	2.528	2.463	0.044	1.803	40.607	61.566	1	
A15	2.319	2.171	2.197	2.120	2.252	2.244	2.204	2.125	2.204	0.063	2.850	45.372	55.100	1	
A16	3.317	3.364	3.301	3.145	3.250	3.256	3.295	3.113	3.255	0.080	2.470	30.721	81.378	1	
A17	4.007	3.918	3.917	3.986	4.019	3.964	3.825	3.998	3.954	0.061	1.533	25.289	98.856	1	sample set not used in PW calculator
A18	2.292	2.362	2.320	2.324	2.345	2.336	2.276	2.360	2.327	0.029	1.235	42.976	58.172	1	
A19	2.396	2.464	2.345	2.397	2.365	2.328	2.411	2.388	2.387	0.039	1.651	41.898	59.669	1	
A20	3.466	3.425	3.451	3.389	3.455	3.418	3.480	3.408	3.437	0.029	0.852	29.099	85.913	3	
A21	2.366	2.294	2.467	2.342	2.296	2.388	2.373	2.329	2.357	0.053	2.230	42.429	58.922	3	
A22	1.231	1.174	1.221	1.177	1.227	1.230	1.196	1.200	1.207	0.022	1.820	82.850	30.175	4	
A23	3.549	3.493	3.562	3.519	3.427	3.466	3.540	3.515	3.509	0.042	1.206	28.499	87.722	4	
A24	2.859	2.867	2.825	2.849	2.821	2.741	2.812	2.767	2.818	0.041	1.467	35.491	70.441	4	
A25	3.285	3.409	3.292	3.457	3.308	3.264	3.263	3.383	3.333	0.069	2.066	30.006	83.316	4	
A26	2.407	2.377	2.442	2.439	2.442	2.399	2.348	2.402	2.407	0.032	1.309	41.545	60.175	4	
A27	3.176	3.216	3.144	3.133	3.181	3.325	3.329	3.194	3.212	0.071	2.199	31.131	80.306	4	
A28	2.881	2.763	2.825	2.728	2.763	2.881	2.785	2.872	2.812	0.057	2.022	35.559	70.306	4	
A29	1.620	1.546	1.529	1.526	1.553	1.506	1.503	1.552	1.542	0.035	2.242	64.856	38.547	4	
A30	3.087	3.070	3.093	3.041	3.025	3.102	3.116	3.106	3.080	0.030	0.982	32.468	77.000	1	
A31	3.560	3.462	3.517	3.486	3.518	3.572	3.581	3.534	3.529	0.039	1.104	28.339	88.219	1	
A32	2.507	2.442	2.381	2.470	2.497	2.435	2.408	2.446	2.448	0.040	1.619	40.844	61.208	5	
A33	2.955	3.131	2.954	3.058	3.047	3.140	3.129	3.078	3.062	0.070	2.273	32.663	76.539	5	
A34	3.275	3.354	3.323	3.300	3.492	3.410	3.454	3.374	3.373	0.071	2.091	29.650	84.318	5	
A35	3.187	3.131	3.059	3.148	3.106	3.133	3.111	3.129	3.125	0.034	1.092	31.998	78.131	6	
A36	3.268	3.444	3.427	3.390	3.227	3.379	3.365	3.349	3.356	0.070	2.076	29.795	83.905	6	
A37	2.799	2.921	2.839	2.900	2.811	2.835	2.805	2.939	2.856	0.052	1.817	35.015	71.398	6	
A38	3.049	3.089	3.196	3.150	3.156	3.137	3.163	3.135	3.134	0.043	1.364	31.905	78.359	6	
A39	3.015	2.971	2.986	2.989	3.038	3.004	3.044	3.036	3.010	0.025	0.846	33.217	75.262	6	
A40	2.481	2.521	2.490	2.483	2.490	2.605	2.525	2.476	2.509	0.040	1.596	39.859	62.722	6	
A41	1.760	1.791	1.741	1.704	1.614	1.797	1.629	1.705	1.718	0.064	3.730	58.224	42.938	6	
Aver-age									**2.868**			**37.214**	**71.692**		**1055.01 1 seeds/oz**
											range 25-82				**709-2324 seeds/oz**

	1	2	3	4	5	6	7	8	mean	stdev	c.o.v.	seeds/g	meanx25	Lab #	
B1	2.320	2.309	2.371	2.301	2.358	2.341	2.384	2.359	2.343	0.028	1.207	42.683	58.572	1	
B2	2.630	2.711	2.650	2.593	2.650	2.733	2.636	2.633	2.655	0.043	1.608	37.672	66.363	1	
B3	3.068	2.936	2.884	2.903	2.944	3.001	2.994	2.999	2.966	0.057	1.906	33.714	74.153	1	
B4	3.242	3.283	3.306	3.161	3.182	3.228	3.201	3.068	3.209	0.070	2.185	31.164	80.222	1	
B5	2.847	2.866	2.833	2.924	2.924	2.985	2.862	2.834	2.884	0.051	1.763	34.670	72.109	1	
B6	2.403	2.388	2.417	2.302	2.353	2.250	2.236	2.296	2.331	0.065	2.796	42.907	58.266	1	
B7	2.176	2.212	2.237	2.189	2.197	2.146	2.222	2.205	2.198	0.026	1.205	45.496	54.950	1	
B8	2.285	2.242	2.261	2.312	2.259	2.306	2.277	2.208	2.269	0.032	1.407	44.077	56.719	1	
B9	2.907	2.941	2.923	3.018	2.998	3.002	2.873	2.951	2.952	0.048	1.616	33.880	73.791	1	
B10	2.690	2.692	2.842	2.781	2.728	2.700	2.768	2.698	2.737	0.051	1.877	36.531	68.434	1	
B11	2.913	2.904	2.864	2.864	2.889	2.920	2.926	2.958	2.905	0.030	1.030	34.426	72.619	1	
B12	2.685	2.840	2.686	2.733	2.881	2.773	2.846	2.803	2.781	0.070	2.504	35.960	69.522	1	
B13	3.331	3.264	3.211	3.176	3.283	3.226	3.160	3.153	3.226	0.059	1.838	31.003	80.638	1	
B14	2.644	2.574	2.625	2.564	2.517	2.543	2.570	2.613	2.581	0.040	1.557	38.741	64.531	2	
B15	2.322	2.305	2.313	2.342	2.296	2.307	2.298	2.281	2.308	0.017	0.744	43.328	57.700	2	
B16	2.834	2.822	2.815	2.819	2.764	2.804	2.814	2.809	2.810	0.019	0.689	35.586	70.253	2	
B17	1.874	1.928	1.908	1.825	1.885	1.830	1.866	1.865	1.873	0.033	1.757	53.401	46.816	4	
B18	3.431	3.376	3.405	3.430	3.343	3.328	3.331	3.387	3.379	0.039	1.158	29.596	84.472	4	
B19	2.270	2.178	2.191	2.229	2.238	2.213	2.217	2.269	2.226	0.031	1.395	44.931	55.641	4	
B20	2.060	2.104	2.047	2.093	2.050	1.963	2.034	2.087	2.055	0.042	2.028	48.668	51.369	4	
B21	2.984	2.902	2.876	2.849	2.842	2.851	2.842	2.878	2.878	0.045	1.553	34.746	71.950	4	
B23	2.339	2.265	2.272	2.334	2.322	2.302	2.360	2.317	2.314	0.031	1.325	43.218	57.847	4	
B24	2.350	2.360	2.352	2.348	2.348	2.329	2.299	2.307	2.337	0.021	0.904	42.797	58.416	4	
B25	1.942	1.877	1.920	1.880	1.884	1.902	1.837	1.819	1.883	0.038	2.011	53.117	47.066	4	
B26	2.277	2.215	2.255	2.247	2.245	2.203	2.270	2.189	2.238	0.030	1.333	44.690	55.941	4	
B27	2.110	1.965	2.008	2.065	2.147	2.036	2.077	2.017	2.053	0.055	2.677	48.706	51.328	4	
B28	2.097	2.072	1.983	2.009	2.104	2.080	2.030	2.013	2.049	0.042	2.073	48.816	51.213	4	
B29	1.767	1.766	1.727	1.766	1.766	1.788	1.716	1.768	1.758	0.022	1.272	56.883	43.950	4	
B30	2.422	2.431	2.424	2.469	2.386	2.404	2.475	2.507	2.440	0.038	1.549	40.988	60.994	4	
B31	2.901	2.879	2.932	2.851	2.905	2.846	2.877	2.837	2.879	0.031	1.071	34.740	71.963	1	
B32	2.399	2.386	2.403	2.389	2.407	2.390	2.415	2.384	2.397	0.010	0.434	41.725	59.916	1	
B33	3.131	3.031	3.169	3.121	3.109	3.088	3.065	3.041	3.094	0.044	1.424	32.317	77.358	5	
B34	3.046	3.009	3.011	3.096	3.317	3.179	3.173	3.185	3.127	0.099	3.181	31.979	78.177	5	
B35	2.776	2.845	2.929	2.885	2.930	2.897	2.931	2.932	2.891	0.052	1.802	34.593	72.269	5	
B36	2.579	2.480	2.539	2.509	2.617	2.553	2.554	2.568	2.550	0.039	1.538	39.218	63.746	5	
B37	2.417	2.448	2.369	2.383	2.335	2.441	2.432	2.392	2.402	0.037	1.526	41.632	60.050	5	
B38	2.431	2.416	2.368	2.355	2.476	2.474	2.452	2.534	2.438	0.055	2.265	41.015	60.954	5	
B39	2.388	2.347	2.368	2.405	2.375	2.359	2.457	2.458	2.395	0.040	1.659	41.761	59.865	5	
B40	1.705	1.685	1.689	1.714	1.732	1.712	1.723	1.720	1.710	0.015	0.896	58.478	42.751	6	
B41	1.723	1.692	1.661	1.715	1.674	1.753	1.694	1.731	1.705	0.029	1.687	58.645	42.630	6	sample set not used in PW calculator
B42	2.240	2.252	2.259	2.202	2.290	2.243	2.252	2.235	2.246	0.023	1.025	44.514	56.162	6	

Average	**2.499**		**41.293**	**62.480**	**1170.654 seeds/oz**
		range	**29-59**		**822-1673 seeds/oz**

2024 Rule Change Proposal 3

PURPOSE OF PROPOSAL: To clarify the minimum working sample weights for noxious weed seed and bulk examinations for kinds in Table 2A with minimum working sample weight for purity analysis but none stated for noxious weed seed and bulk examinations.

PRESENT and PROPOSED RULE: (change indicated with red text)

2.3 Size of working samples

b. **Purity analysis, noxious weed seed examination, bulk examination. –**

When a purity analysis is performed, the weight of the purity working sample may be considered part of the minimum weight specified for the noxious weed seed examination or bulk examination.

(1) **Single kinds listed in Table 2A.** The weight of the working samples for the purity analysis, noxious weed seed examination and bulk examination shall not be less than that prescribed in Table 2A, except as noted in (3) below. The working weights listed in Table 2A are based on the approximate weight of 2,500 pure seed units for the purity analysis and 25,000 pure seed units for the noxious weed seed and bulk examinations (unless otherwise specified in Table 2A). Working sample weights listed in Table 2A are not intended to be adjusted based on the amount of inert matter or other species content.

When no working sample weight is provided in Table 2A for a noxious weed seed or bulk examination and the minimum purity analysis working weight is less than 500 grams, the minimum working sample weight for a noxious weed seed or bulk examination may be calculated based on the number of seeds per gram provided in Table 2A for the kind of seed to be tested. In no case does the amount examined need to exceed 500 grams for raw seed. For those kinds listed in Table 2A that show greater than 500 grams as the minimum weight for purity analysis, the actual weight given shall also be considered the minimum quantity to be examined for noxious weed seeds. Refer to section 2.3.b(5)(a) for coated, encrusted, and pelleted seed.

HARMONIZATION STATEMENT:
This proposal is for clarification of the current AOSA Rules based on footnote b of Table 2A and represents no substantive change to the current principles and practices of the AOSA Rules.

SUPPORTING EVIDENCE:
This proposal is for clarification of the current AOSA Rules based on footnote b of Table 2A. While the footnote is extremely useful information, this information is not readily visible in the main text of the AOSA Rules in sec. 2.3(b) where the quantity of seed to test for purity analysis, noxious weed seed examination, and bulk examination is detailed. This lack of clarity can lead to non-uniformity in testing among AOSA and SCST members.

SUBMITTED BY: Deborah J. Lionakis Meyer and Nishit Patel, AOSA-SCST Purity Subcommittee.

DATE SUBMITTED: October 12, 2023

2024 Rule Proposal 4

PURPOSE OF PROPOSAL: Adding organic growing media (O) as an optional/alternative method for testing of field and garden pea (*Pisum sativum*)

PRESENT RULE:

Pisum sativum L. field pea and garden pea	B, T, S, TCS	20	5	8	Hard seeds: see sec. 6.2d and 6.9m(6)	

PROPOSED RULE:

Pisum sativum L. field pea and garden pea	B, T, S, TCS,O	20	5	8	Hard seeds: see sec. 6.2d and 6.9m(6)	

HARMONIZATION/IMPACT STATEMENT: The rule proposal does not harmonize with the Federal Seed Act, Canadian Methods & Procedures, or the ISTA rules.

The difference will be adding organic growing media as a primary test method. When performing a retest, organic growing media is recommended as an alternative test method but having it as a primary test method will help reduce the amount of retesting needed.

This proposal does not affect seed industry or State Regulatory Officials.

This proposal does not impact other rules volumes.

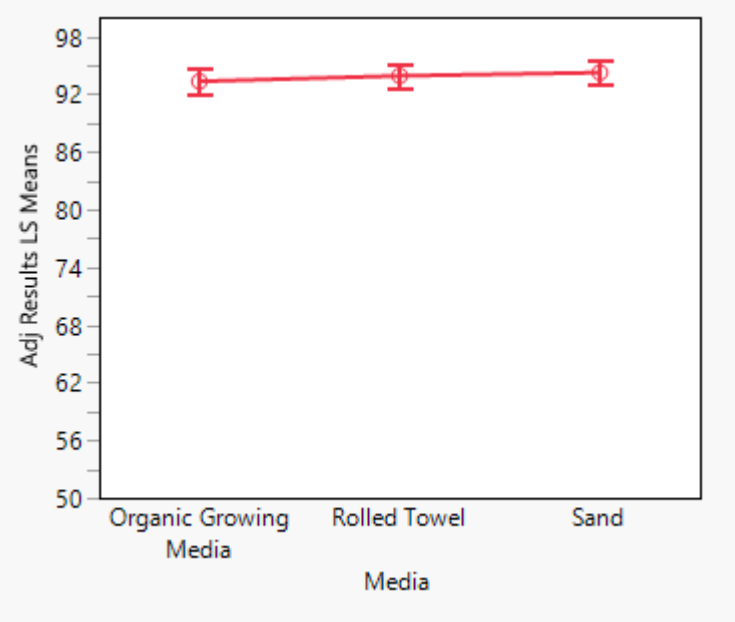
SUPPORTING EVIDENCE:

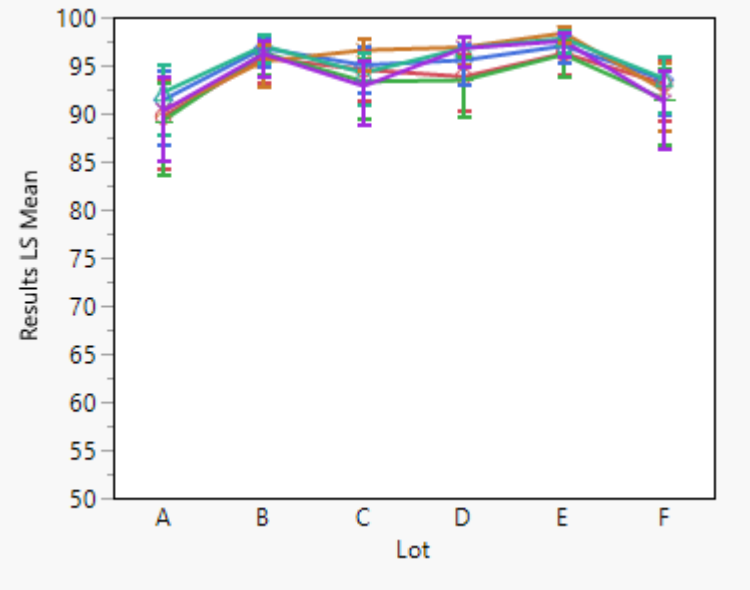
6 different labs tested 6 lots of peas of all different varieties without treatment and of varying quality (83 - 99%) on 3 different test methods towel, sand, and organic growing media. Blotter (B) was not utilized in this study. Consensus observed at the Germination Committee meeting in June 2023, public responses suggest that blotter may be a candidate for method removal. Additional data of support to follow.

Results provided are below.

Karen Richard from Statistical Committee provided the analysis of results.

Lab	Lot	Rolled Towel	Sand	Organic Growing Media
Z	A	84	89	92
X	A	90	92	92
V	A	90	90	86
U	A	92	92	86
T	A	85	91	85
S	A	90	84	89
Z	B	95	97	97
X	B	97	97	98
V	B	97	98	86
U	B	98	97	96
T	B	96	98	95
S	B	96	92	98
Z	C	87	93	95
X	C	94	93	95
V	C	97	98	95
U	C	95	97	92
T	C	94	94	90
S	C	97	93	92
Z	D	97	96	98
X	D	97	96	98
V	D	97	100	93
U	D	92	98	95
T	D	94	95	89
S	D	94	91	95
Z	E	97	99	97
X	E	98	97	99
V	E	98	99	99
U	E	97	98	97
T	E	96	97	96
S	E	97	98	93
Z	F	89	90	91
X	F	95	90	94
V	F	92	92	91
U	F	91	94	94
T	F	90	89	92
S	F	96	90	90





Level		Least Sq Mean
Sand	A	95.45
Rolled Towel	A	94.84
Organic Growing Media	A	94.51

Levels not connected by same letter are significantly different.

CONCLUSION: 6 different labs tested 6 lots of peas without treatment of varying qualities (83 - 99%) across 3 different testing platforms: rolled towel, sand, and organic growing media. The analysis of results provided in this study demonstrate no statistical difference between the primary test methods of rolled towel and sand

for peas and the proposed method of organic growing media.

ACKNOWLEDGMENTS: Much appreciation to the participating labs in this study: Bayer Crop Science, Indiana Crop Improvement Association, Nebraska Crop Improvement, Sakata Seed America, Inc., SeedCheck Technologies, Inc., SGS Brookings

SUBMITTED BY: Kaitlin Houghtby

DATE SUBMITTED: 10/13/2023

Additional supporting evidence can be found on the Rules Committee website, or may be downloaded as a powerpoint file here: Organic Media PowerPoint

2024 Rule Proposal 5

TITLE: Adjusting Temperature Variation Specified in Rules

PURPOSE OF PROPOSAL: To harmonize AOSA with ISTA and Canadian M&P, giving analysts the flexibility of a maximum variation due to apparatus of +/- 2℃ instead of +/- 1℃ during a germination test.

PRESENT RULE:
6.9 c Temperature

> "Variation from the temperature specified in the Rules should not be more than ±1 °C due to the apparatus."

PROPOSED RULE:

6.9 c Temperature

> Altering the allowed temperature variation from "Variation from the temperature specified in the Rules should not be more than ±1 °C due to the apparatus" to "Variation from the temperature specified in the Rules should not be more than ±2 °C due to the apparatus."

HARMONIZATION/IMPACT STATEMENT: This is the allowed temperature variation standard for both ISTA and the Canadian M&P rules and would promote harmonization between all three sets of rules and provide the same temperature standard for labs testing under AOSA rules and ISTA/M&P.

SUPPORTING EVIDENCE: This change is meant to harmonize the allowed temperature variation allowed within a testing apparatus among ISTA, M&P, and AOSA rules. This rule change will allow labs that test both ISTA/M&P and AOSA to have a set standard of ±2 °C within their chambers and not 2 different standards for germination temperature variation.

Canadian Methods and Procedures for Testing Seed (M&P) 4.5.4 Temperature

> "The temperature indicated must be regarded as a maximum and variation due to the apparatus must not be more than ± 2°C."

ISTA: 5.6.2.3 Temperature

> "For any test, whether in darkness or under artificial light or in in-direct daylight, variation from the prescribed temperature must not be more than ±2 °C."

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DATE SUBMITTED: 10/5/23

2024 Rule Change Proposal 6

PURPOSE OF PROPOSAL: To clarify when the numbers of seeds found of other crop seeds and weed seeds are stated on the Report of Analysis.

PRESENT RULE and PROPOSED RULE (proposed changes indicated in red text)**:**

SECTION 3: THE PURITY ANALYSIS

Other crop seed – Seeds of plants grown as crops (other than the kind(s) and cultivar(s) included in the pure seed) shall be considered other crop seeds, unless recognized as weed seeds by laws, regulations, or by general usage; refer to section 4. All interpretations and definitions for pure seed in section 3.2 shall also apply in determining whether seeds are other crop or inert matter with the following four exceptions that may be applied as acceptable alternatives~~:~~ as stated in 3.3.a-d. Refer to sec. 15.i for reporting requirements.

Uniform blowing procedure in section 3.6 for kinds assigned to Table 3A PSU 23 and 24 may be disregarded. If disregarded, all seed units for these kinds found in the working sample shall be manually separated into pure seed and inert matter. Only units containing at least one caryopsis with some degree of endosperm development that can be detected either by slight pressure or by examination over light are considered other crop.

For kinds assigned to Table 3A PSU 24, all multiple units found in the working sample shall be manually separated into single florets. Each floret containing a caryopsis with some degree of endosperm development that can be detected either by slight pressure or examination over light is considered other crop. Empty florets and glumes, if present, are considered inert matter.

Multiple unit procedures in section 3.7 for kinds assigned to Table 3A PSU 22 may be disregarded. If disregarded, all multiple units and single units (as defined in section 3.7) for these kinds found in the working sample shall be manually separated into single florets. Each floret containing a caryopsis that is at least one-third the length of the palea measured from the base of the rachilla is considered other crop. Empty florets and glumes, and florets containing a caryopsis less than 1/3 the length of the palea measured from the base of the rachilla are considered inert matter.

For kinds in which the PSU includes more than one seed, the seed unit shall be opened, the number of seeds found counted and reported under the other crop seeds. All parts of the seed unit, as defined in section 3.2, are classified as other crop seed if at least one seed is present.

Weed seed — Seeds, florets, bulblets, tubers, or sporocarps of plants recognized as weeds by laws, official regulations, or by general usage shall be considered weed seeds; refer to section 4. For classification of badly damaged or immature weed seeds or seed-like structures refer to section 3.5 b. Refer to sec. 15.i for reporting requirements. Special requirements are as follows:

Individual seeds and seed-like structures are to be removed from fruiting structures (such as capsules, heads, pods, etc.), counted and included with the weed seeds. Grass spikelets or spikelet groups are to be separated into individual florets and those containing caryopses are counted as weed seeds (refer to section 3.5 b for inert matter related to grass weeds). Fruiting structures and accessory structures as specified in section 3.5 b are included with the inert matter. For *Ambrosia* spp. refer to section 3.5 b (8).

Wild onion and wild garlic (*Allium* spp.) bulblets:

Bulblets that have any part of the husk remaining and are not damaged at the basal end are considered weed seeds regardless of size.

Bulblets that are completely devoid of husk, and are not damaged at the basal end, and are retained by a 1/13-inch round-hole sieve are considered weed seeds. For *Allium* spp., bulblets classed as inert matter, refer to section 3.5 b (5).

SECTION 15: REPORT OF ANALYSIS (ROA)

Laboratory reports of analysis that indicate laboratory testing was performed in accordance to the AOSA Rules for Testing Seeds are required to include, but not be limited to, the following information:

When a purity analysis is conducted the following information must be reported under Purity Analysis:

Weight of purity working sample.

Percentage by weight of pure seed, other crop seed, inert matter and weed seed found in the purity working sample, given to two decimal places.

Scientific name, or common name, or both, of all other crop seed or weed seed found in the purity working sample. If none are found, this must be indicated by the word none or none found. The numbers of individual seed units found for each contaminating species may be reported upon request or at the discretion of the laboratory.

HARMONIZATION/IMPACT STATEMENT:

This proposal will not substantially change in the current laboratory practices for AOSA and SCST members. The proposed addition to Section 15 – Report of Analysis will simply clarify that reporting of the numbers of individual seed units of contaminating species found during a purity analysis is to be done upon request or at the discretion of the laboratory conducting the testing. Although knowing the number of seeds of contaminating species can provide valuable information to the ROA end user regarding potential field infestation, particularly for small seeded species for which percentage values may not reflect potential infestation impact, this proposal will provide flexibility to labs on reporting such data for every sample tested. However, weed seeds that are found in the purity analysis and are also declared as noxious weed seeds may be counted as part of the total number of noxious weed seeds found in the noxious weed seed examination if the working sample

weight of the purity analysis is included as part of the total working sample weight for the noxious weed seed examination.

The Federal Seed Act Regulations (FSA) do not require counting the number of other crop seed or weed seeds found in a purity analysis. The FSA does not provide instructions on reporting the results of the purity analysis. Similar to the AOSA Rules, under the FSA weed seeds that are found in the purity analysis and are also declared as noxious weed seeds may be counted as part of the total number of noxious weed seeds found in the noxious weed seed examination.

The ISTA Rules do not require counts of other seeds found in the purity analysis. The ISTA Rules do offer a separate test based on approximately ten times the purity analysis working sample weight for the 'Determination of Other Seeds by Number' and this information is reported under 'Other Determinations' on the ISTA International Certificate. This ISTA test is similar to the 'AOSA Bulk Exam' for other seeds.

The Canadian Methods and Procedures require certain contaminating species be counted in accordance with the Canadian Seed Grading Standards.

SUPPORTING EVIDENDCE:
The current AOSA Rules are in conflict regarding the counting of seeds of contaminating species. In sections 3.3.d and 3.4.a the Rules clearly state that seed shall be counted, while in sec. 15.i there is no requirement for reporting such seed counts. In sections 3.3.a, b, and c, the AOSA Rules seem to imply counting of other crop seeds because the instructions given require separating attached florets into single florets containing a caryopsis. The instructions given in sections 3.3 and 3.4 are very important for testing uniformity with respect to what structures are to be classified as other crop seeds and weed seeds for the percentage by weight portion of a purity analysis. Whether or not the seed counts are reported the structures classified as other crop seeds, weed seeds, or inert matter must remain standardized among all laboratories so that the percentages of each purity component can be compared among ROAs or ROAs and seed lot labels.

The reporting of the numbers of other crop seeds and weed seeds on the AOSA ROA was an issue considered by the AOSA/SCST Report of Analysis Working Group. As a result of the working group's efforts a rule proposal was presented in 2022 (rule proposal #12) to require reporting the number of seeds of each contaminating species found in a purity analysis. The proposal failed during the Rules voting process. The major objections to the 2022 proposal were the potential time/labor cost involved in counting the seeds of contaminating species and the cost of reprogramming laboratory databases to accommodate reporting such data on ROAs. While the proposed text does not completely resolve the uniformity issue on ROAs it does clarify that this information may be requested of the laboratory and also confirms that laboratories may report such data under the other crop and weed seed sections of the ROA.

SUBMITTED BY: Deborah Meyer, Purity Subcommittee SCST Co-chair, dmeyerseeds@gmail.com; Nishit Patel, Purity Subcommittee AOSA Co-chair, nishpatel@pa.gov

DATE SUBMITTED: October 12, 2023

2024 RULE CHANGE PROPOSAL 7

Purpose of Proposal: To reclassify the species class of *Thelesperma* filifolium to Flower (F) and Range (R) in the AOSA Rules for Testing Seeds Volume 3, and to change the "contaminating classifications" to crop based on the usage of this genus, since it is sold as reclamation and wildflower seed in commerce.

Present Rule:

none

Proposed Rule: *Thelesperma filifolium., stiff greenthread, Asteraceae*

Nomen #	Scientific name	Common name	Family	Spp class	CONTAMINATING CLASSIFICATION						
					A	F	H	R	S	T	V
317113	Thelesperma filifolium	Stiff greenthread	Asteraceae	F, R	W	C	W	C	W	W	W

Harmonization: There is no harmonization with the ISTA Rules or the Canadian M & P in this proposal. The ISTA Rules and the Canadian M & P do not classify weed and crop seed through the AOSA Rules Volume 3. The Federal Seed Act Regulations, based on the statement "general usage" in section 201.49 (Other crop seed), determines the classification of a contaminating species using the AOSA Rules Volume 3. The impact on the seed industry would be to recognize the genus in this proposal as being in commerce. Classifying this Genus as flower (F) and range (R) under the species class and as "other crop" (C) instead of "weed seed" (W) in the appropriate contaminant classification categories.

Supporting Evidence: *Thelesperma* spp. or greenthread is a genus native to North and South America, composed of herbaceous annuals and perennials with small yellow flowers and thin leaves. All species found in the U.S. are native to the lower 48 states. *Thelesperma filifolium* is particularly common in Texas as a rangeland flower that blooms profusely. It thrives in disturbed areas and provides a source of nectar for pollinators where there may be little else. The seeds provide a food source as well for granivorous birds. Currently greenthread species are being sold as wildflowers by companies that specialize in reclamation and native flower seeds.

References:

https://www.wildflower.org/plants/result.php?id_plant=THFIF
https://www.wildflower.org/plants/search.php?
search_field=thelesperma&family=Acanthaceae&newsearch=true&demo=

Companies selling Thelesperma filifolim:

westernnativeseed.com

everwilde.com

avseeds.com

applewoodseeds.com

wildseedfarms.com

trueleafmarket.com (in their Texas/Oklahoma wildflower mix)

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Date Submitted: October 5, 2023

Note: Proposal was reviewed by Purity Subcommittee Co-chairs Nishit Patel and Deborah Meyer.

2024 Rule Change Proposal 8

PURPOSE OF PROPOSAL: To add *Bromus riparius* Rehmann × *B. inermis* Leyss., hybrid bromegrass, to Volume 3.

PRESENT RULE:

None.

PROPOSED RULE:

Volume 3. Uniform Classification of Weed and Crop Seeds

Nomen #	Scientific name	Common name	Family	Spp class	CONTAMINATING CLASSIFICATION						
					A	F	H	R	S	T	V
NA	*Bromus riparius* Rehmann × *B. inermis* Leyss.	hybrid bromegrass	Poaceae	A	C	W	W	W	W	W	W

HARMONIZATION/IMPACT STATEMENT: *Bromus riparius* × *B. inermis*, hybrid bromegrass, is not currently listed in the Federal Seed Act Regulations, the Canadian Methods and Procedures for Testing Seeds, or the International Rules for Seed Testing. This species is sold as a new forage crops in Canada and the United States.

SUPPORTING EVIDENDCE:
Hybrid bromegrass was added to Volume 1 of the AOSA Rules during the 2022-23 rule proposal cycle. The pure seed unit definition, working sample weights, and germination test specifications were added to Volume 1; however, the species classification and contaminating classifications were not added to Volume 3 at that time.

Hybrid bromegrass is generated by crossing meadow bromegrass (*Bromus riparius*) and smooth bromegrass (*B. inermis*). The resulting hybrid is a slightly creeping, winter hardy, long-lived perennial, good drought tolerance, dual purpose forage grass for both hay and pasture systems, with faster regrowth compared to *B. inermis*, and greater hay yields compared to *B. riparius*. Three Canadian varieties, Knowles and Success, were released in 2000 and 2003, respectively, and Torque was released in 2018. Since the superior quality of hybrid bromegrass in fast growth and high yield than their parental species, it was widely used as forage in Canada and the USA.

REFERENCES:
Biswas, D. K., Coulman, B., Biliqetu, B., and Fu, Yong-Bi. 2019. Advancing bromegrass breeding through imaging phenotyping and genomic selection: A review. Front lant Sci 10:1673. https://www.frontiersin.org/articles/10.3389/fpls.2019.01673.

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

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

Coulman, B. 2013. Dryland grass breeding for the Canadian Prairies. Western Beef Development Centre presentation. http://westernbeef.org/pdfs/field_days/2013_summer_fieldday/WBDCFieldDay_2013_Coulman.pdf

Coulman, B. and Ferdinandez, Y. S. N. Hybrids between meadow and smooth bromegrass: a new forage crop for Canada. XX International Grassland Congress Proceedings. https://uknowledge.uky.edu/igc/20/themeA/95/

Mori, N. 2023. Brome grasses fact sheet. https://www.bcclimatechangeadaptation.ca/app/uploads/BF04-FactSheet-Brome-Grasses-2023.pdf

United States Environmental Protection Agency (EPA). 2023. Agricultural Pasture, Rangeland and Grazing https://www.epa.gov/agriculture/agricultural-pasture-rangeland-and-grazing [Accessed October 2, 2023].

SUBMITTED BY: Deborah Meyer, Purity Subcommittee SCST Co-chair, dmeyerseeds@gmail.com; Nishit Patel, Purity Subcommittee AOSA Co-chair, nishpatel@pa.gov;

2024 Rule Proposal 9

Purpose: To correct the common names for various species of *Galium* in Volume 3 of the AOSA Rules.

Current Rule and Proposed Rule: (proposed changes indicated in red text)

Volume 3. Uniform Classification of Weed and Crop Seeds (if adopted, changes will be made to all sections of Vol. 3)

Nomen #	Scientific name	Common name	Family	Spp class	CONTAMINATING CLASSIFICATION						
					A	F	H	R	S	T	V
103276	*Galium aparine* L.	cleavers; ~~gallium~~ stickywilly	Rubiaceae	H, R	W	W	W	W	W	W	W
316690	*Galium asprellum* Michx.	bedstraw, rough	Rubiaceae	W	W	W	W	W	W	W	W
103277	*Galium boreale* L.	bedstraw, northern	Rubiaceae	R	W	W	W	C	W	W	W
103278	*Galium mollugo* L.	bedstraw, white; madder, wild; false baby's breath	Rubiaceae	W	W	W	W	W	W	W	W
103279	*Galium odoratum* (L.) Scop.	woodruff, sweet; bedstraw, sweet scented	Rubiaceae	W	W	W	W	W	W	W	W
311992	*Galium* spp.	bedstraw	Rubiaceae	W	W	W	W	W	W	W	W
316691	*Galium spurium* L.	cleavers, false	Rubiaceae	W	W	W	W	W	W	W	W
318334	*Galium tricorne* Stokes, pro parte = *Galium tricornutum* Dandy										
316692	*Galium tricornutum* Dandy	bedstraw, corn; bedstraw, three-horn; bedstraw, rough fruit corn	Rubiaceae	W	W	W	W	W	W	W	W
493385	*Galium verrucosum* Huds.	bedstraw, warty	Rubiaceae	W	W	W	W	W	W	W	W

Harmonization Statement

The AOSA Rules, Canadian laws and regulations and some state laws and regulations include various species of *Galium*. The common names currently found in Volume 3 and those found in various legal jurisdictions and recognized in the USDA PLANTS database and the USDA GRIN database are included in this proposal.

Supporting Evidence

Galium aparine (cleavers), *G. mollugo* (false baby's breath), *G. spurium* (false cleavers), and *Galium verrucosum* (warty bedstraw) are Secondary Noxious Weed Seeds in Canada (GOC 2023). *Galium tricorne*, now a synonym of *G. tricornutum*, is a restricted noxious weed seed in Oregon, and all species of *Galium* (bedstraw) are prohibited noxious weed seeds in Connecticut, New Hampshire and Vermont and are restricted noxious weed seeds in Massachusetts, Pennsylvania, and Washington (USDA-AMS 2023). Although no changes to the common names of *Galium* spp., *G. asprellum*, *G. boreale*, and *G. verrucosum* are proposed here, their common names have been verified as appearing in one or more of the listed references.

References

Government of Canada (GOC). 2023. Weed Seeds Order, 2016. https://laws-lois.justice.gc.ca/eng/regulations/SOR-2016-93/FullText.html [Accessed October 4, 2023].

United States Department of Agriculture-Agricultural Marketing Service (USDA-AMS). 2023. State Noxious-Weed Seed Requirements Recognized in the Administration of the Federal Seed Act. PDF available at: https://www.ams.usda.gov/rules-regulations/fsa [Accessed October 4, 2023].

United States Department of Agriculture-Agricultural Research Service-National Plant Germplasm System (USDA-ARS-NPGS). 2022. Germplasm Resources Information Network (GRIN Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland, https://npgsweb.ars-grin.gov/gringlobal/taxon/taxonomysearch?t=pnlspecies [Accessed October 4, 2023].

United States Department of Agriculture-Natural Resources Conservation Service (USDA-NRCS). 2023. Plants Database. https://plants.usda.gov/home/basicSearchResults?resultId=89139d10-eb3d-4a13-a8d3-22c347379906 [Accessed October 4, 2023].

2024 Rule Change Proposal 10

PURPOSE OF PROPOSAL: To improve the definitions of the species classifications in AOSA Rules Volume 3.

PRESENT AND PROPOSED RULE: (changes indicated in red text)

SYMBOLS AND DEFINITIONS USED IN RULES VOLUME 3

Species involved directly or indirectly in seed commerce have been described by different classes in Rules Volume 3. These classes and their associated symbols are described as follows:

Agricultural (A) – Cultivated crops which are harvested for grain, ~~en~~silage, fiber, sugar, oil, or hay, or are planted for culturally improved pastures.

Flowers (F) – Domesticated or wild plants grown for the aesthetic appearance of the flowers or foliage.

Herbs and Spices (H) – Cultivated species grown for the aromatic, medicinal or flavor qualities of their seed or vegetative parts. Often these species are perennial and subject to multiple harvest of annual top growth.

Revegetation and Rangeland (R) – Native or introduced species capable of establishing permanent vegetation on rangelands and naturalized pastureland or used to stabilize disturbed or denuded sites.

Shrub and Trees (S) – Woody, perennial species including fruit producing species.

Turf (T) – Species used for lawns, sports fields, or play areas. They are usually perennial, stoloniferous or rhizomatous grasses ~~and~~ subject to mowing to maintain uniform top growth.

Vegetable (V) – Cultivated species where the seeds, fruit, stems or roots are consumed as food. They are mostly herbaceous annuals, but some are perennial in temperate and tropical zones.

Weeds (W) – Undesirable species that are excessively competitive, difficult to control or eradicate, poisonous, or simply not wanted. This symbol is used in the "spp. Class" column (see Format for Rules Volume 3, item four, page v) if the species is generally weedy in nature. The weeds category may also be used in response to the "contaminating" species classification under the seven crop types as described under Format for Rules Volume 3, item five, page v.

HARMONIZATION STATEMENT:

The AOSA Rules are unique in the use of the multiple species classification system to define the crop types under test to determine the classification of contaminating species as either other crop seed or weed seed. This type of system is not used by the ISTA Rules or the Federal Seed Act Regulations to segregate agricultural seed from revegetation and rangeland or turf type seeds. The Canadian seed grading system does segregate crops into a variety of crop groups based on use, however, the AOSA Rules and the Canadian seed grading systems serve different purposes for assessing marketable seed.

SUPPORTING EVIDENCE:

The purpose of the proposal is to better define the species classes of agricultural (A), revegetation and range-

land (R), and turf (T) so that species listed in Volume 3 and species to be added to Volume 3 can be appropriately assigned to one or more species classes. The proposed changes attempt to incorporate information from the United States Environmental Protectional Agency and the United States Department of Agriculture regarding rangeland, pastures, and turf.

The following descriptions are taken from EPA (2023).

"Rangelands are those lands on which the native vegetation (climax or natural potential plant community) is predominantly grasses, grass-like plants, forbs, or shrubs suitable for grazing or browsing use. Rangelands include natural grassland, savannas, many wetlands, some deserts, tundra, and certain forb and shrub communities."

"Pastures are those lands that a primarily used for the production of adapted domesticated forage plants for livestock."

"Other grazing lands include woodlands, native pastures, and croplands producing forages."

"The major differences between rangelands and pastures are the kind of vegetation and level of management that each land area receives.

Rangeland:

Supports native vegetation.

Includes areas that have been seeded to introduced species (e.g., crested wheatgrass), but which are extensively managed like native range.

Pastures:

Lands that have been seeded, usually to introduced species (e.g., tall fescue) or in some cases to native plants (e.g., switchgrass).

Are intensively managed using agronomy practices and control of livestock."

The following definitions are taken from USDA-NRCS (2022):

"Introduced species - A species not a part of the original fauna or flora of the area in question."

"Ensile - (1) To preserve a forage crop as silage. (2) The act of placing a forage crop in a silo."

"Forage crops - (Specific) Forage plants mechanically harvested before being fed to animals. These crops are fed to animals primarily as hay, haylage, fodder (stover), silage, or green chop. (General) A crop of cultivated plants, whose plant parts, other than separated grain, are produced to be grazed or harvested for use as feed for animals."

"Hay - The herbage of grasses, legumes, or comparatively fine-stemmed forbs cut and cured (dried) to preserve forage for later use as livestock feed."

"Improved pasture - Grazing land permanently producing introduced or domesticated native forage species that receives varying degrees of periodic cultural treatment to enhance forage quality and yields and is primarily harvested by grazing animals."

"Naturalized pasture - Naturalized pasture is cleared, converted, past cultivation, and "old-field" or "go-back land." It is forestland and cropland that primarily contain introduced species that are largely adapted and have become established without agronomic and cultural inputs, persist under the current conditions of the local environment, and are stable over long time periods."

"Open range - (1) Rangeland that has not been fenced into management units. (2) All suitable rangeland of an area upon which grazing is permitted. (3) Untimbered rangeland. (4) Rangeland on which the livestock owner

has unlimited access without benefit of land ownership or leasing."

"Pasture/Pastureland - Land composed of introduced or domesticated native forage species that is used primarily for the production of livestock. Pastures receive periodic renovation and cultural treatments, such as tillage, fertilization, mowing, weed control, and may be irrigated. Pastures are not in rotation with crops."

"Range - Land on which the historic and/or introduced vegetation is predominantly grasses, grass-like plants, forbs or shrubs managed as natural ecosystem. Range land may include natural grasslands, savannas, shrublands, tundra, alpine communities, marshes and meadows."

"Rangeland - Rangeland is a land cover or use composed of grasses, grass-like plants, forbs, shrubs, and trees that is typically unsuited to cultivation because of physical limitations such as low and erratic precipitation, rough topography, poor drainage, or cold temperatures. Rangeland can include the following: (i) natural lands that have not been cultivated and consist of a historic complement of adapted plant species; and (ii) natural (go-back lands, old-field) or converted revegetated lands that are managed like native vegetation. Note: The USDA-NRCS rangeland Natural Resources Inventory (NRI) includes this designation in their definition of rangeland. In assessing rangeland conditions and health, keeping these designations separate would provide for more detailed information about rangeland trends and health."

"Silage - Forage preserved in a succulent condition by organic acids (lactic acid primarily) produced by partial anaerobic fermentation of sugars in the forage."

"Sod - Vegetation that grows to form a mat of soil and vegetation. (Syn.) turf."

"Sod grasses - Stoloniferous or rhizomatous grasses that form a sod or turf."

"Turf - (Syn.) sod."

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United States Environmental Protection Agency (EPA). 2023. Agricultural Pasture, Rangeland and Grazing https://www.epa.gov/agriculture/agricultural-pasture-rangeland-and-grazing [Accessed October 2, 2023].

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DATE SUBMITTED: October 12, 2023

2024 Rule Proposal 11

Purpose: To correct the common names for various species of *Phacelia* and *Plagiobothrys* in Volume 3 of the AOSA Rules.

Current Rule and Proposed Rule: (proposed changes indicated in red text)

Volume 3. Uniform Classification of Weed and Crop Seeds (if adopted, changes will be made to all sections of Vol. 3)

Nomen #	Scientific name	Common name	Family	Spp class	CONTAMINATING CLASSIFICATION						
					A	F	H	R	S	T	V
316774	*Phacelia californica* Cham.	phacelia, California	Hydrophyllaceae [Boraginaceae]	F	W	C	W	W	W	W	W
312139	*Phacelia campanularia* A. Gray	bluebell~~s~~, California; ~~phacelia, harebell~~ desertbells; bluebells, desert	Hydrophyllaceae [Boraginaceae]	F, R	W	C	W	C	W	W	W
463067	*Phacelia cicutaria* Greene	phacelia, caterpillar	Hydrophyllaceae [Boraginaceae]	R	W	W	W	C	W	W	W
408229	*Phacelia crenulata* Torr.	~~bluebells, desertbells;~~ wildheliotrope, cleftleaf; phacelia, notch-leaved	Hydrophyllaceae [Boraginaceae]	F, R	W	C	W	C	W	W	W
455794	*Phacelia hastata* Douglas ex Lehm.	~~phacelia, lanceleaf;~~ phacelia, silverleaf	Hydrophyllaceae [Boraginaceae]	R	W	W	W	C	W	W	W
316775	*Phacelia minor* (Harv.) Thell. ex F. Zimm.	~~phacelia, bluebell~~ bells, wild canterbury	Hydrophyllaceae [Boraginaceae]	F	W	C	W	W	W	W	W
317088	*Phacelia* spp.	phacelia~~;~~ ~~scorpionweed~~	Hydrophyllaceae [Boraginaceae]	W	W	W	W	W	W	W	W
27492	*Phacelia tanacetifolia* Benth.	phacelia, tansy; phacelia, lacy	Hydrophyllaceae [Boraginaceae]	F, R	W	C	W	C	W	W	W
316916	*Plagiobothrys figuratus* (Piper) I. M. Johnst.	~~scorpionweed~~ popcornflower, fragrant	Boraginaceae	W	W	W	W	W	W	W	W
317309	*Plagiobothrys hispidulus* (Greene) I. M. Johnst. = *Plagiobothrys scouleri* (Hook. & Arn.) I. M. Johnst. var. *hispidulus* (Greene) Dorn										
316969	*Plagiobothrys scouleri* (Hook. & Arn.) I. M. Johnst. var. *hispidulus* (Greene) Dorn	~~popcornflower, hairy; scorpionweed, small~~ popcornflower, sleeping; popcornflower, harsh; allocarya, harsh	Boraginaceae	W	W	W	W	W	W	W	W
316999	*Plagiobothrys* spp.	popcornflower; ~~scorpionweed~~	Boraginaceae	W	W	W	W	W	W	W	W

Harmonization Statement

The common names currently found in Volume 3 for *Phacelia* and *Plagiobothrys* and their species can be confusing and in some cases are misapplied. The proposal is to better align the common names in Volume 3 with those recognized in various commonly available references for native species (Calflora 2023; COSEWIC. 2008; JFP 2023; LBJWC 2023; USDA-ARS-NPGS 2023; USDA-NRCS 2023; Walden 2023; Wikipedia 2023a and 2023b)

Supporting Evidence

The common name 'scorpionweed' has been used in Volume 3 for two very different genera; *Phacelia* and *Plagiobothrys*. This fact can lead to confusion when only common names are used in a Report of Analysis (ROA). To resolve this issue, we looked at all the species of *Phacelia* and *Plagiobothrys* currently listed in Volume 3 and the table below is a comparison of common names among commonly used references for these species (Calflora 2023; JFP 2023; LBJWC 2023; USDA-ARS-NPGS 2023; USDA-NRCS 2023; Walden 2023; Wikipedia 2023a and 2023b).

Scientific Name	Current Common Name AOSA Rules Volume 3	Common Name GRIN Database (USDA-ARS-NPGS 2023)	Common Name PLANTS Database (USDA-NRCS 2023)	Common Name Jepson eFlora (JFP 2023)	Common Name Wikipedia (2023a, 2023b)	Common Name Flora of North America Vol. 15 (Walden 2023)	Calflora (2023)	Lady Bird Johnson Wildflower Center (LBJWC 2023)
Phacelia californica	California phacelia	---	California phacelia	---	California phacelia	California phacelia	rock phacelia	California phacelia
Phacelia campanularia	California bluebells; harebell phacelia	California bluebell; desert bluebells	desertbells	desert bluebells	California bluebell; desertbells	desert blue bells	desert bells	desert bluebells; desert bells; desert canterbury bells; bluebells
Phacelia cicutaria	caterpillar phacelia	caterpillar phacelia	caterpillar phacelia	---	caterpillar phacelia	caterpillar phacelia	caterpillar phacelia	caterpillar phacelia; caterpillar scorpion-weed
Phacelia crenulata	desertbells bluebells; cleftleaf wildheliotrope	---	cleftleaf wildheliotrope	---	cleftleaf wildheliotrope; notch-leaved phacelia	wild heliotrope	notch leaved phacelia	cleftleaf wildheliotrope; heliotrope phacelia
Phacelia hastata	lanceleaf phacelia; silverleaf phacelia	---	silverleaf phacelia	---	silverleaf phacelia	silverleaf phacelia	white leaved phacelia	silverleaf phacelia; whiteleaf phacelia; silverleaf scorpionweed
Phacelia minor	bluebell phacelia	California bluebell	wild canterbury bells	wild canterbury bells	wild canterbury bells	wild canterbury bells	wild canterbury bells	wild canterbury bells; California bells
Phacelia spp.	phacelia; scorpionweed	---	phacelia	---	phacelia; scorpionweed	phacelia		---
Phacelia tanacetifolia	tansy phacelia	tansy phacelia	lacy phacelia	---	lacy phacelia	lacy phacelia; tansy phacelia	tansy leaved phacelia	lacy phacelia; lacy scorpionweed
Plagiobothrys figuratus	scorpionweed	---	fragrant popcornflower	---	fragrant popcornflower		---	fragrant popcornflower; fragrant popcorn-flower; fragrant popcorn flower; fragrant allocarya
Plagiobothrys hispidulus = *Plagiobothrys scouleri* var. *hispidulus*	---	---	---	harsh popcornflower	Cascade popcornflower	---	harsh allocarya	
Plagiobothrys scouleri var. *hispidulus*	hairy popcornflower; small scorpionweed	---	sleeping popcornflower	See *Plagiobothrys hispidulus*	See *Plagiobothrys hispidulus*	---	See *Plagiobothrys hispidulus*	sleeping popcornflower; harsh popcornflower; harsh popcorn flower; harsh allocarya
Plagiobothrys spp.	popcornflower; scorpionweed	---	popcornflower	popcornflower	popcornflower	---	---	---

--- species not in the cited reference or no common name given in the cited reference.

Using the common name scorpionweed for both *Phacelia* spp. and *Plagiobothrys* spp. is not only confusing but is also a poor choice to use a common name with the imbedded term 'weed' when applying it to native plant species, some of which are rare and/or endangered. Most common names for species of *Phacelia* include terms like 'phacelia', 'bluebells', or 'bells' (USDA-NRCS 2023) and most common names for species of *Plagiobothrys* include the term 'popcornflower' (USDA-NRCS 2023); therefore, we recommend using the common name phacelia for the genus *Phacelia* and the common name popcornflower for the genus *Plagiobothrys*. The name scorpionweed should be removed from Volume 3.

The comparison table indicates that the common name California phacelia is widely recognized as applying to *Phacelia californica* (LBJWC 2023; USDA-NRCS 2023; Walden 2023; Wikipedia 2023a) and the common name caterpillar phacelia is widely recognized as applying to *Phacelia cicutaria* (Calflora 2023; LBJWC 2023; USDA-ARS-NPGS 2023; USDA-NRCS 2023; Walden 2023; Wikipedia 2023a) and these names should

remain unchanged in Volume 3.

For *Phacelia campanularia* the common names California bluebell, desertbells, and desert bluebells are all widely used and should be recognized in Volume 3 (Calflora 2023; JFP 2023; LBJWC 2023; USDA-ARS-NPGS 2023; USDA-NRCS 2023; Walden 2023; Wikipedia 2023a). The common name harebell phacelia should be removed from Volume 3.

For *Phacelia crenulata* the common name cleftleaf wildheliotrope appears to be the most widely recognized common name for this species (LBJWC 2023; USDA-NRCS 2023; Wikipedia 2023a). Notch-leaved phacelia could also be used (Calflora 2023; Wikipedia 2023a). Desertbells bluebells should be removed from Volume 3 for this species as this common name could be confused with those recommended for *Phacelia campanularia* (desert bluebells and desertbells).

Silverleaf phacelia is the most widely recognized common name for *Phacelia hastata* (LBJWC 2023; USDA-NRCS 2023; Walden 2023; Wikipedia 2023a). Lanceleaf phacelia should be removed from Volume 3.

Wild canterbury bells is the most widely used common name for *Phacelia minor* (Calflora 2023; LBJWC 2023; JFP 2023; USDA-NRCS 2023; Walden 2023; Wikipedia 2023a). Bluebell phacelia should be removed from Volume 3.

For *Phacelia tanacetifolia* the common names lacy phacelia and tansy phacelia are both widely used (LBJWC 2023; USDA-ARS-NPGS 2023; USDA-NRCS 2023; Walden 2023; Wikipedia 2023a).

Fragrant popcornflower is the most widely recognized common name for *Plagiobothrys figuratus* (COSEWIC 2008; LBJWC 2023; USDA-NRCS 2023; Wikipedia 2023b). Scorpionweed should be remove from Volume 3 for this species.

For *Plagiobothrys scouleri* var. *hispidulus* [=*Plagiobothrys hispidulus*] common names used include sleeping popcornflower (LBJWC 2023; USDA-NRCS 2023), harsh popcornflower (JFP 2023; LBJWC 2023), and harsh allocarya (Calflora 2023; LBJWC 2023). The common names hairy popcornflower and small scorpionweed should be removed from Volume 3 for this taxon.

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COSEWIC. 2008. COSEWIC assessment and status report on the fragrant popcornflower *Plagiobothrys figuratus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 23 pp. https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/cosewic-assessments-status-reports/fragrant-popcornflower.html [Accessed October 11, 2023]

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Submitted by: Deborah J. Lionakis Meyer and Nishit Patel, AOSA-SCST Purity Subcommittee.

Date Submitted: October 12, 2023

2024 RULE CHANGE PROPOSAL 12

PURPOSE: To add Asteraceae family - Flower seedlings with tall hypocotyls – ex. *Tagetes spp*. Marigold

PRESENT RULE:

None

PROPOSED RULE:

This rule would add a page to AOSA Rules for Testing Seeds Volume 4. Seedling Evaluation which describes how to evaluate flower seedlings that have tall hypocotyls with *Tagetes spp*. (marigold) as the example.

HARMONIZATION AND IMPACT STATEMENT:

ISTA Handbook on Flower Seed Testing has a page that is specifically about *Tagetes spp*. This rule proposal criteria matches the criteria laid out for *Tagetes spp*. in the ISTA Handbook on Flower Seed Testing. Canada Methods and Procedures do not mention tall hypocotyls with *Tagetes spp.* and neither does AOSA Rules. Flower seedlings with tall hypocotyls are commonly used in the flower industry, so this addition would be helpful for those types of species.

SUPPORTING EVIDENCE:

Germination methods

The supporting evidence is following criteria from other Asteraceae family evaluation pages from the AOSA Rules for Testing Seeds Volume 4 Seedling Evaluation publication, and different seedling pictures were voted on within the AOSA/SCST Flower Seed Committee to determine if seedlings were normal or abnormal. The ISTA Handbook on Flower Seed Testing was also referenced to make sure we are producing a page with the same guidelines as ISTA.

References

1. AOSA Rules for Testing Seeds. 2022. Association of Official Seed Analysts, Inc. Washington, DC, USA.

2. International Seed Testing Association. 2023. ISTA International Rules for Seed Testing. Bassersdorf, Switzerland.

3. ISTA Handbook on Flower Seed Testing Second Edition 2020. International Seed Testing Association. Bassersdorf, Switzerland.

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Date Submitted: October 13, 2023

Rule Proposal 12—Supporting Evidence

SEEDLING EVALUATION HANDBOOK

ASTERACEAE FAMILY – Flower seedlings with tall hypocotyls - ex. *Tagetes spp.* Marigold

Ageratum spp., ageratum
Callistephus chinensis, China aster
Cosmos bipinnatus, cosmos
Cosmos sulphureus, klondyke cosmos
Helichrysum bracteatum, helichrysum, strawflower
Symphyotrichum novae-angliae, New England aster
Tagetes spp., marigold
Zinnia spp., zinnia

GENERAL DESCRIPTION Seedling type: Epigeal dicot

Food reserves: Cotyledons which expand and become thin, leaf-like and photosynthetic.

Shoot system: The hypocotyl elongates and carries the cotyledons above the soil surface. The epicotyl usually does not show any development within the test period.

Root system: A long primary root. Secondary or adventitious roots usually do not develop within the test period unless the primary root has been damaged.

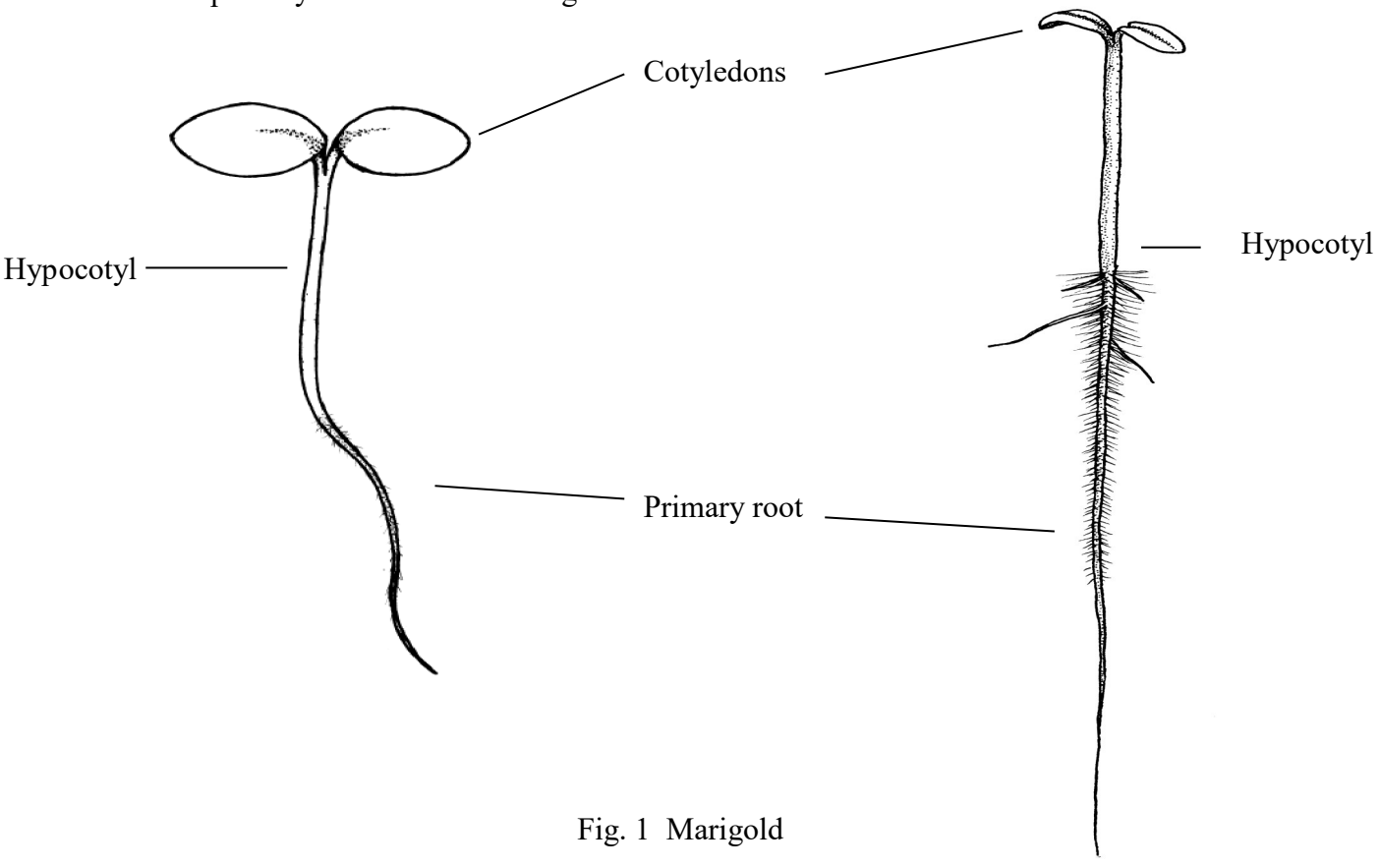


Fig. 1 Marigold

ABNORMAL SEEDLING DESCRIPTION

Cotyledons:
less than half of the original cotyledon tissue remaining attached.

less than half of the original cotyledon tissue free of necrosis or decay.

Epicotyl:
missing (may be assumed to be present if cotyledons are intact).

Hypocotyl:
deep open cracks extending into the conducting tissue.

malformed, such as markedly shortened, curled or thickened.

watery

Root:
none.

weak, stubby or missing primary root. Secondary roots will not compensate.

Seedling:
one or more essential structures impaired as a result of decay from primary infection.

albino.

NOTES:

In rolled towel testing, at evaluation time if observed too many seedlings with lesions on hypocotyl or other part of seedling, it could be damage introduced by too tightly rolling up the towels (retest suggested).

If too many seedlings are missing primary roots double check the sowing method if used sowing heads (seeds sticking upright in holes and breaking of root tips at planting – retest suggested).

Fig. 2 Cotyledon defects
2a. Missing cotyledons
2b. Underdeveloped 3 cotyledons
2c. Cotyledons trapped in seed coat, need to remove seed coat to check if cotyledons are decayed.
If decayed cotyledons, the seedling is abnormal.

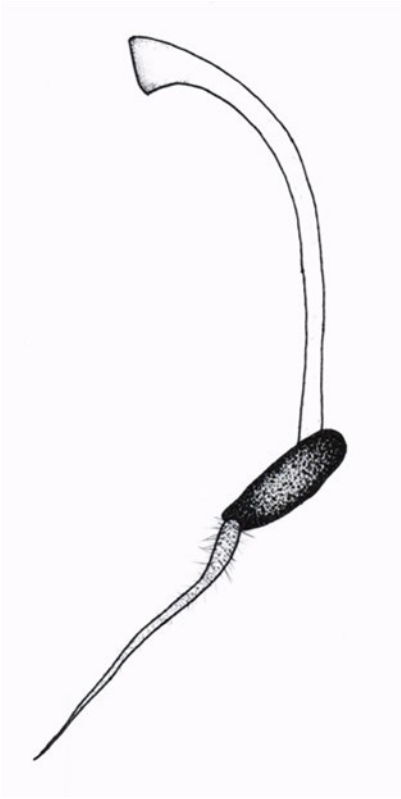


Fig 2a (-)

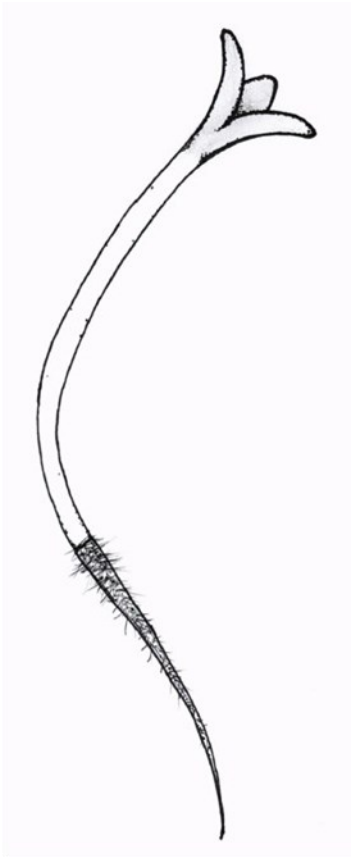


Fig 2b (-)

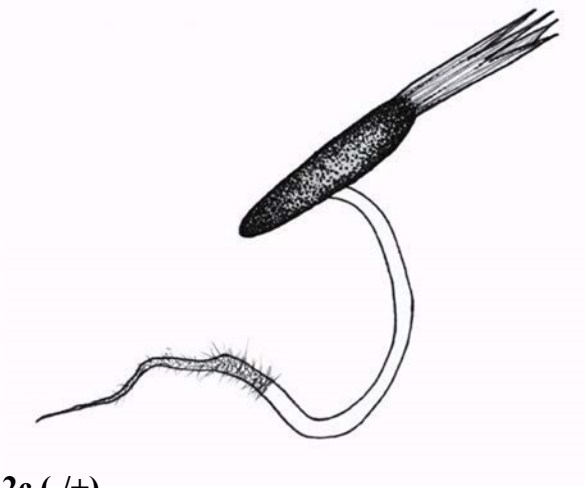
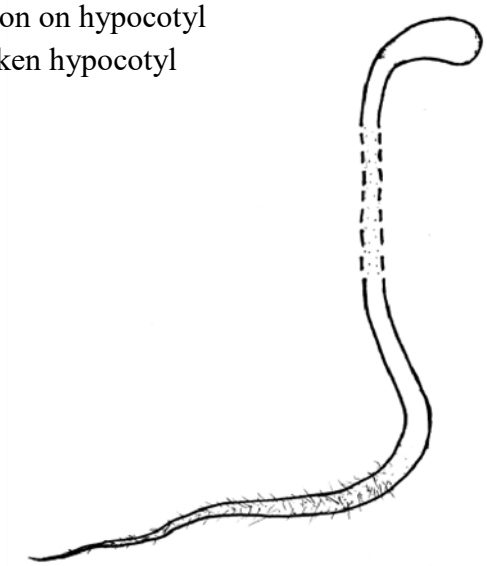


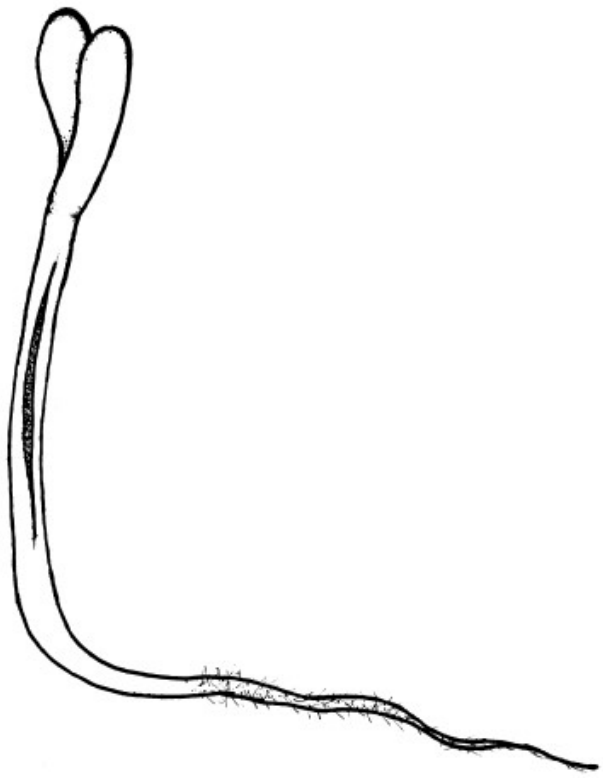
Fig 2c (-/+)

Fig. 3 Hypocotyl defects

3a. watery hypocotyl
3b. lesion on hypocotyl
3c. broken hypocotyl



3a (-)



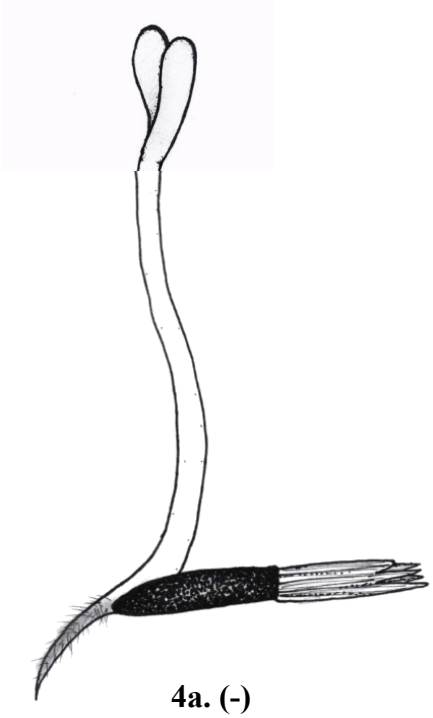
3b (-)

3c (-)

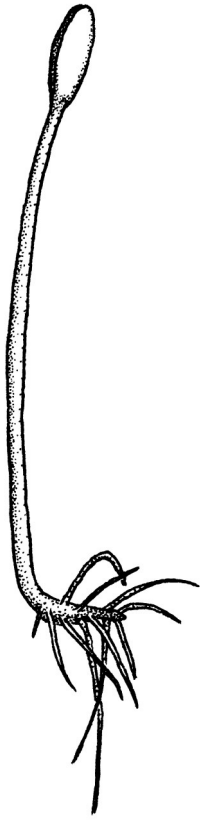
Fig. 4 Root defects

4a. root short and/or decayed as a result of primary infection

4b. primary root missing and secondary roots will not compensate for missing primary root



4a. (-)

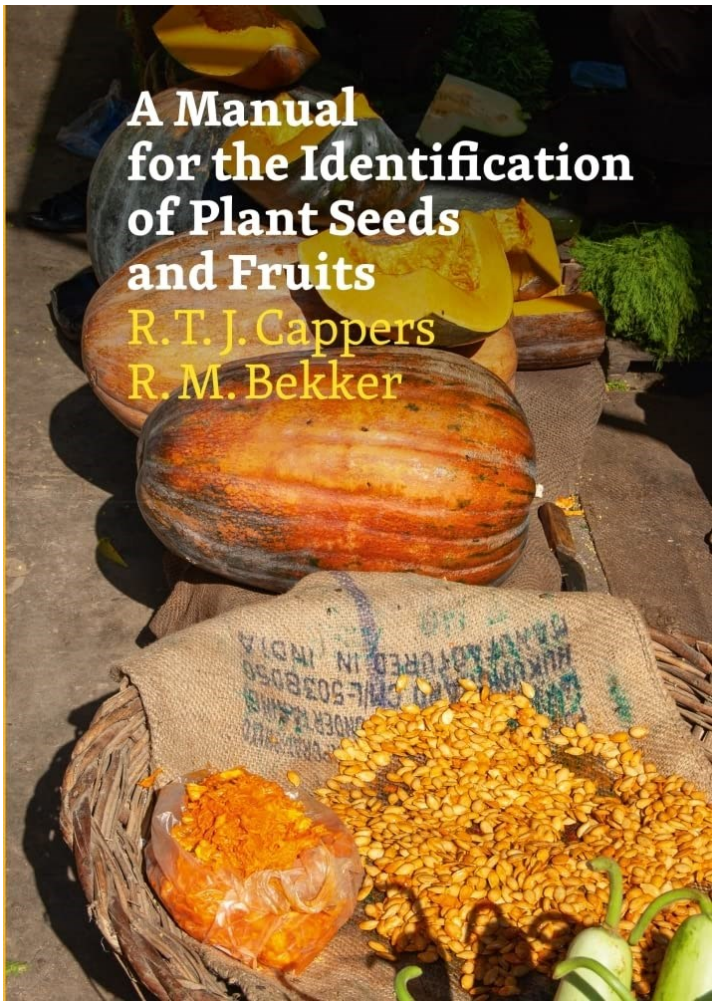


4b. (-)

Resource Review: *A Manual for the Identification of Plant Seeds and Fruits,* 2nd Edition

By Quinn Gillespie

A Manual for the Identification of Plant Seeds and Fruits
R.T.J. Cappers, R.M. Bekker,
Digital Seed Atlas Project
2021 (Second edition)



Cover Image of the 2021 Edition

A Manual for the Identification of Plant Seeds and Fruits is one of several publications produced by the Digital Plant Atlas project, a collaboration between the University of Groningen and The German Archaeological institute in Berlin. First published in 2013, and completely revised for the 2021 edition, this manual focuses specifically on the family traits exhibited in seeds and fruiting structures of various plant species. The number of families described in the new edition been expanded from 19 to 30.

The book is organized by family, with a useful heading that provides any alternative names for the family, a common name for the family, type genus, the number of genera, an approximate number of species, and ovary position and includes images of the type genus as a plant with its diaspore. Each chapter also acknowledges any genera or species that make for complicated taxonomy. As most analysts have experienced, advances in DNA testing have changed the classification of numerous species over the years, combining some into the same family and splitting others into new families altogether. While it may never be possible to keep up with the constant flow of changes, the inclusion of previous classifications and family names in this volume may prove helpful for analysts trying to link older source material to current nomenclature.

Each chapter also identifies the economically important genera for that family, inflorescence and infructescence characteristics, possible diaspores and their identifying characteristics, and any species which may exhibit heterodiaspory, with a chart of species typical for each method of seed dispersal. Descriptions are very clear and include valuable information about the functionality of the characteristics unique to each family.

For new analysts and those studying the principles of seed identification, this will be very helpful in differentiating similar-appearing genera that come from different families. When learning to identify seeds, one of the

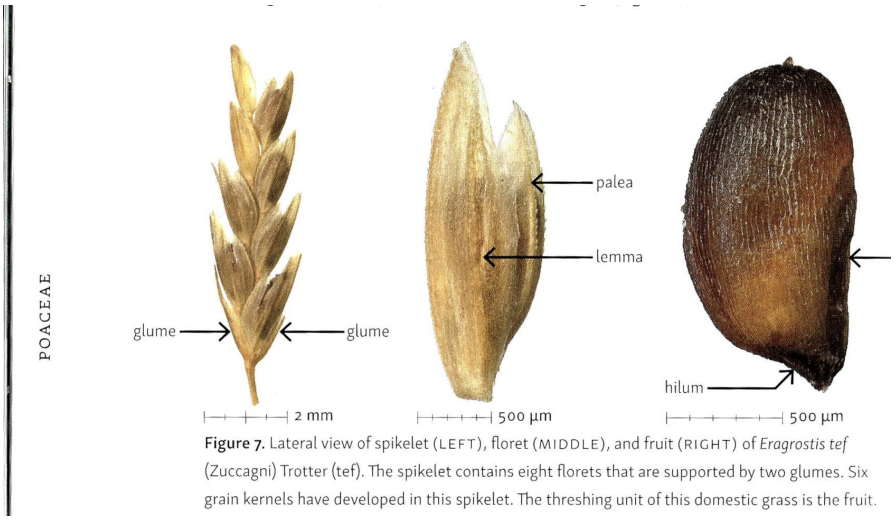


Figure 7. Lateral view of spikelet (LEFT), floret (MIDDLE), and fruit (RIGHT) of *Eragrostis tef* (Zuccagni) Trotter (tef). The spikelet contains eight florets that are supported by two glumes. Six grain kernels have developed in this spikelet. The threshing unit of this domestic grass is the fruit.

Image credit: Cappers, RTJ; Bekker,RM; *A Manual for the Identification of Plant Seeds and Fruits, 2021, p. 294*

most useful pieces of knowledge is knowing why seeds take a certain shape and how it is applicable to their dispersal, a subject this reference goes into in depth.

The photos are very clear, full-color images, similar to those used in other Digital Seed Atlas Project publications. The plates for each family include true seeds, fruiting bodies, and intact diaspores. In addition, the comparison plates include multiple presentations of seeds and seed units when a species may have more than one presentation. Excellent examples of this include *Spinacia oleracea* with and without spiny attachments, images of both flattened and triangular *Persicaria maculosa. The Manual* also includes plates of seeds in-situ, still present in their pods, or with perianth and accessory structures intact. For many species these features are extremely important to accurate seed identification.

A Manual for the Identification of Plant Seeds and Fruits does not aim to be an encyclopedia of seed images, but rather presents a more in-depth look into the defining characteristics of a range of seed families and the many different ways that seeds can appear when they show up in the lab. For many analysts this is the jumping off point to an expanded knowledge of seed identification.

This book is available online, through Barkhuis for €75.00, which does make it a more affordable reference manual. The 2013 edition is available on JSTOR. Selected chapters and pages are available on Google Books at the time of this publication for those who would like to preview the material.

Families Described

Amaranthaceae	Cyperaceae	Papaveraceae
Apiaceae	Ericaceae	Plantaginaceae
Asparagaceae	Euphorbiaceae	Poaceae
Asteraceae	Fabaceae	Polygonaceae
Boraginaceae	Geraniaceae	Primulaceae
Brassicaceae	Juncaceae	Ranunculaceae
Caprifoliaceae	Lamiaceae	Rosaceae
Caryophyllaceae	Linaceae	Rubiaceae
Convolvulaceae	Malvaceae	Scrophulariaceae
Cucurbitaceae	Onagraceae	Solanaceae

Study Guide: Molecular Biology Word Search

Genetic Technology Committee: Education subcommittee

1. The branch of biology dealing with the study of the functioning of living things. The materials of this science include all life: animals, plants, microorganisms, and viruses.
2. Reproducibility of results obtained under varying conditions such as different labs and equipment.
3. A substance (e.g., produced in some cases by disease-causing microorganisms) which is poisonous to certain other living organisms.
4. Acronym for surface active agent. Amphipathic molecules (i.e., molecules that contain both a polar and nonpolar domain) which, due to their unique properties, position themselves at interfacial regions (surfaces) such as ah oil/water interface. When surfactants are dissolved above a certain critical concentration in either water or nonpolar solvents they may form micelles or reverse micelles, respectively. Surfactants are commonly used to solubilize cell membrane components and other hard to solubilize molecules.
5. These antibodies are produced by selecting antibody producing cells from an immunized mouse and hybridizing them with cells derived from myelomas creating hybridoma cells. The antibodies produced from such hybrid cells are identical to one another.
6. One of the two men responsible for discovering and developing #5
7. A unit of mass equal to 1,000 Daltons.
8. An organism that obtains nourishment from the ingestion and breakdown of organic matter.
9. The percentage of times that the test will produce a false reading.
10. Cry proteins are produced by Bacillus _____ bacteria.
11. The loss of the native conformation of a macromolecule resulting, for instance, from heat, extreme pH (i.e., by acidity of basicity) changes, chemical treatment, etc. It is accompanied by loss of biological activity.
12. The last process of the Central Dogma of Molecular Biology
13. In an ELISA Plate, this measures the optical density associated with the regents used in the test and plate. A well with no sample that is used as a baseline for the plate reader, removes any background color.
14. Also called an immunogen. Any large molecule or small organism whose entry into the body provokes synthesis of an antibody or immunoglobin (i.e., an immune system response).
15. This term refers to one of several alternate forms of a gene occupying a given locus on the chromosome, which controls expression (of product) in different ways.
16. Any substance (entity), either of protein or of nonproteinaceous nature, that increases the rate of a chemical reaction, without being consumed itself in the reaction. In the biosciences, the term "enzyme" is used.
17. Discrete units of the genome carrying many genes, consisting of (histone) proteins and a very long molecule of DNA. Found in the nucleus of every plant and animal cell.
18. A molecule created by fusing together (e.g., via recombination or chemically) two unlike (different) molecules. The purpose of this is to create a molecule in which one of the original molecules has one function, for example, a toxic, cell-killing function, while the other original molecule has another function, such as

targeting the toxin to a specific site in the body, which might be cancerous cells.

19. Also called antigenic determinant. The specific group of atoms (on an antigen molecule) that is recognized by (that antigen's) antibodies.

20. The total genetic, or hereditary, constitution that an individual receives from its parents. An individual organism's genotype is distinguished from its phenotype, which is its appearance or observable character.

21. A type of chemical messenger (peptide), occurring both in plants and animals, that acts to inhibit or excite metabolic activities (in that plant or animal) by binding to receptors on specific cells to deliver its "message."

22. The pH at which a particular molecule or surface carries no net electrical charge.

Find your answers in the Word Search on the next page!

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1. Physiology 2. Ruggedness 3. Toxin4. Surfectant 5. Monoclonal 6. Milstein 7. Kilodalton 8. Heterotroph 9. Errorrate 10. Thuringiensis 11. Denaturation 12. Translation 13. Blank 14. Antigen 15. Allele 16. Catalyst 17. Chromosomes 18. Conjugate 19. Epitope 20. Genotype 21. Hormone 22. Isoelectricpoint

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A R P C I W S T O X U D Y Y N C G P F F H N U Y D S F N K W
P J X J R Y B A C E N O T L A D O L I K G O P Y O I V G N P
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D Q D Q N Z N Q K E K N A L B H P B I A G O K V N A S B A B
G Z J B G L Q O H P N D U Q B V P X B X W E R E L Z K R M U
I S I L I R M H I K X U R W H T C S A P H J Y Y U R K U I Z
K L Q A E X K D G T N O D Z W S I G J N U Y S U K V O M N E
C M N N N P X V E A A I E F J W P B Y H M T U E G G W U F E
K A K O S G V Z C X B L X R U G G E D N E S S X D H B P V G
C B G L I B H O G E L G S O H O R M O N E A C I J P Y W K B
J H H C S I G J L X F M U N T T E C B J W X V M Q V K F E R
D G E O Q J Q R T Q B N K G A P K F O V P P B X J V R X A T
N H P N X W Y T F Y Y A I U F R Y G O L O I S Y H P P X D E
U X O O O I L N B S I L F E L M T W D H U D H I N D X B T D
A A T M V M L M E T H H Z C T A M O N Z D I V Z U E A A H G
A F I Q B N W T Z E A V T K Z S R J X R V G X Q R Q R E D Y
H W P B X Z U Q D L J A R J L Z L N R Z E U A X C R U D E C
Y M E I M O O W D R Y Q Y Q Z U T I N W R T Y X O E F V R S
V R I K Q G E N O T Y P E L R O Y K M F Q M E R G D I Z F T
H B W U U N L A H E V R Q A O G D M F Q C D R D U S F X J T
W O O X O Z E D C U A P D Z C S J Q K U V E F V N A M J I L
I Y S W Z M B B O Y B O T N I O P C I R T C E L E O S I F U

Study Guide: Seed Vocabulary Connections

How to play:

Match up words that can be grouped together in some way.

If you get stuck, clues for each grouping can be found at the bottom of the page.

PAPPUS	HISPID	AWN	RADICLE
OVATE	PUBESCENT	SPHEROID	PEDICEL
ENDOSPERM	FUNICULUS	PLUMOSE	TESTA
GLOBULAR	COTYLEDON	ELLIPTICAL	HIRSUTE

Answers

1. _____ _____ _____ _____

2. _____ _____ _____ _____

3. _____ _____ _____ _____

4. _____ _____ _____ _____

Different ways seeds might be described as hairy, bristly, or furry.

Parts of seed embryos

Different "little bits" that extend from seeds.

Different ways of specifying seed shape other than just "round."