



United States Department of Agriculture



Agricultural Marketing Service  
Seed Regulatory and Testing Division

# ITEMS OF INTEREST IN SEED

2018

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## EDITOR'S NOTES

*"Can you find another market like this?  
Where, with your one rose you can buy hundreds of rose gardens;  
Where for one seed you get a whole wilderness?"*

- Rumi, "The Seed Market" (c. 1273)

Seed Regulatory and Testing Division (SRTD) continues to focus on the importance of each seed as we work with our regulatory colleagues, industry partners and public stakeholders to expand and improve seed testing and trade. This issue of Items of Interest in Seed focuses on such topics as the spread of noxious weeds and fungal infestations in bahiagrass. Also included are answers to some of your frequently asked questions about the Federal Seed Act, U.S patent numbers, germination standards and arbitration.

This year has been one of change for SRTD as we have transitioned from the Livestock, Poultry, and Seed Program to the Science and Technology Program (S&T), still under the USDA's Agricultural Marketing Service (AMS). The purpose of the realignment of SRTD is to consolidate all seed related services under one AMS program which will allow for more efficient coordination of services, development policies, and implementation of initiatives aligned with seed industry objectives.

This change has brought new leadership to SRTD and we are excited to welcome Dr. Ruihong Guo to Team Seed! Dr. Guo is the Deputy Administrator of S&T and is already familiar with the U.S. seed industry and its key organizations through her oversight of the USDA's Plant Variety



*Dr. Ruihong Guo, USDA, AMS, S&T Dep. Administrator*

Protection Office. We have worked closely with her as a result of Federal Seed Act enforcement of protected varieties under the Plant Variety Protection Act. Dr. Guo also oversees the USDA's National Testing Laboratories which is also located in Gastonia, NC in shared office space with SRTD. We look forward to continuing to improve our service to the seed industry under Dr. Guo's leadership. For more information about S&T, visit the [S&T page on the AMS website](#).

As always, please let me know if you have suggestions for future topics by sending an email to [elizabeth.tatum@ams.usda.gov](mailto:elizabeth.tatum@ams.usda.gov).

On behalf of the SRTD staff, I hope you enjoy these articles and continue to find them informative.

Elizabeth Tatum  
IOI Editor

## **DIFFERENTIATING TALL FESCUE VARIETIES USING ESTERASE ENZYMES**

Seed Regulatory and Testing Division (SRTD) Plant Physiologist Yujia Wu and Dr. Richard Payne (G&P Consulting Services) developed a method to differentiate Kentucky 31 tall fescue from other tall fescue varieties. The method was verified using known Kentucky 31 and Fawn check samples.

### **Check Samples:**

1. Kentucky 31 Breeder class seed from the 2003 production year received from the Kentucky Foundation Seed Project.
2. Fawn Foundation class seed from 2011 received from the Oregon Foundation Seed Program.

### **Seed Planted:**

Seeds from 10 tall fescue samples along with Kentucky 31 and Fawn check samples were planted in commercial potting soil in plastic flats. Each sample was labeled and the flats were placed in SRTD greenhouse at 25° C.

### **Protein Extraction:**

Four weeks after planting, approximately 400 seedlings of each sample were harvested, bunched together, and the lower stems were finely cut. Then 0.5 g of seedling tissue were ground using a mortar and pestle for two minutes with 0.6 mL of 0.75 mM Tris buffer (pH 7.5) to which 0.1%  $\beta$ -mercaptoethanol was added before the extraction. The ground stems and buffer were poured into 1.5 mL tubes that were sealed and put on ice. The scissors, mortars, and pestles were thoroughly cleaned between uses.

After 15 min of extraction on ice, the test tubes with seedling tissue and buffer were placed in a refrigerated centrifuge (4° C) and run at 10,000 rpm for ten minutes. Ten  $\mu$ l of supernatant from each centrifuged sample was transferred to PCR tubes along with 4  $\mu$ l of loading buffer (500  $\mu$ l ampholyte (pH 5-7), 500  $\mu$ l glycol and small amount bromophenol blue dye). At this point the supernatant with loading buffer was ready to load on the gel. The supernatant could also have been placed in a -20° C freezer until needed.

### **Preparation of Isoelectric Focusing (IEF) gels:**

The IEF gel was prepared with 1.68 g of pure urea powder (final concentration is 2M), 9.83 mL of 18 mega  $\Omega$  pure water, 2.24 mL of 30% acrylamide and 1.68 mL of 40% ampholytes (pH 5-7). The gel solution was degassed for five minutes under a fume hood. After degassing, 12  $\mu$ l of TEMED and 140  $\mu$ l of freshly made 10% ammonium persulfate were added to the gel solution. The gel solution was poured into the gel cassette and an 18 well comb inserted into the top of the gel solution.

### **Electrophoresis:**

IEF cathode buffer was used for the top buffer and IEF anode buffer was used for the bottom buffer. The 18 well gel comb in the electrophoresis chamber was carefully removed and the wells were rinsed with the top buffer. The samples were removed from the freezer and, after several minutes, run with a mini-centrifuge. Ten  $\mu$ l of each sample were loaded into the appropriate well. The micropipette tip was washed between loading individual samples with 18

mega  $\Omega$  pure water. The gel with loaded samples was placed in the electrophoresis chamber and the electrophoresis chamber was put in an ice bath during the gel running. The power supply program was 100 v for 60 min, 250 v for 60 min, and 500 v for 30 min.

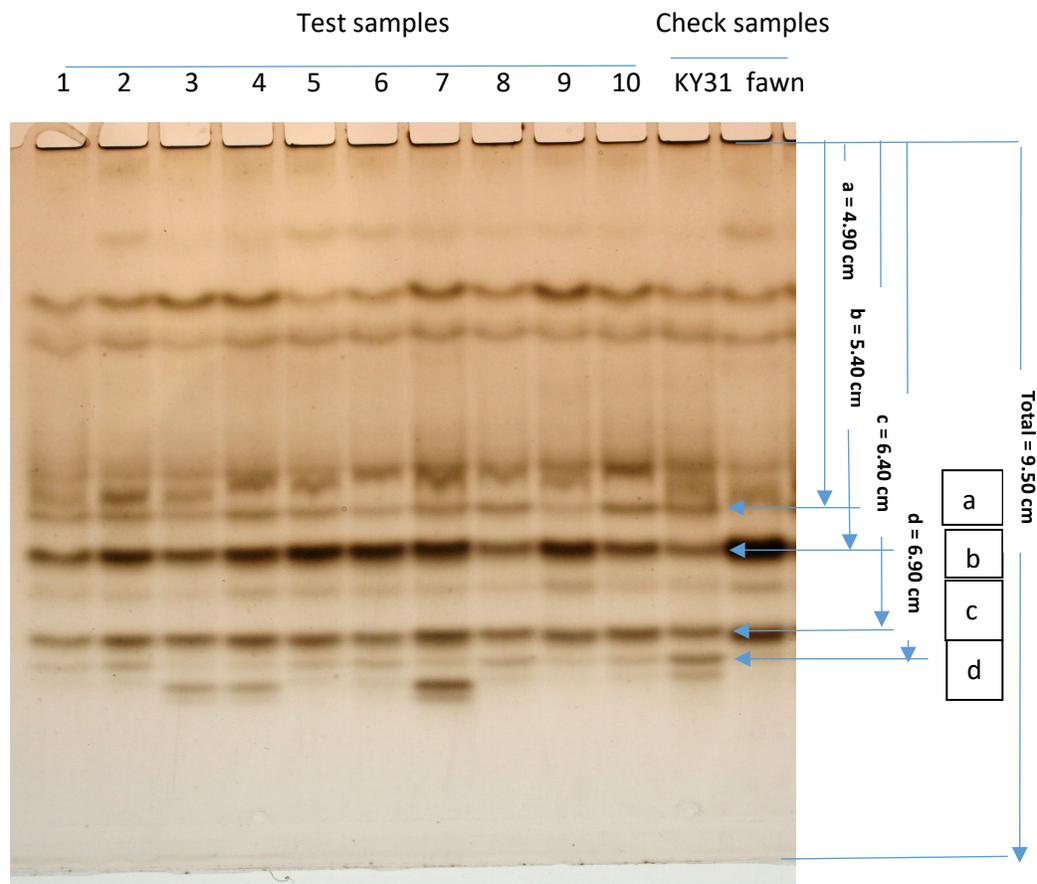
### **Gel Removal and Staining Process:**

The gel was carefully removed from the electrophoresis chamber and marked for correct orientation. The esterase enzymes were stained with a solution of 15 mg of 1-naphtyl acetate, 40 mg of Fast Blue RR salt dissolved in 2 mL of acetone to which 100 mL of 0.1 M  $\text{NaH}_2\text{PO}_4$  was added. The gel and staining solution were placed in a water bath in the dark at 30° C for 30 min or until the esterase bands had developed.

### **Evaluation of Stained Gels:**

Stained gels were put in water to rinse and prepare for storage. Photographs of stained gels were taken to document the test results.  $R_f$  values (the distance a stained esterase band migrated, divided by the distance the bromophenol blue marker dye migrated) were calculated to identify esterase bands. Banding patterns of the 'Kentucky 31' and 'Fawn' check samples were easily distinguishable.

### **Result of Tall Fescue IEF gel, pH 5-7 Electrophoresis with Esterase Staining**



The gel staining shows that test samples 2, 5, 6, 8, and 10 have similar bonding patterns on bands a, b, c, and d of the Kentucky 31 variety.

Kentucky 31 check samples a, b, c and d marker bands  $R_f$  values are:

$$R_f a = 4.90 / 9.50 = 0.51$$

$$R_f b = 5.40 / 9.50 = 0.57$$

$$R_f c = 6.40 / 9.50 = 0.67$$

$$R_f d = 6.90 / 9.50 = 0.7$$

### **Conclusion:**

The IEF gel electrophoresis test provides a way to distinguish Kentucky 31 from other tall fescue varieties by examining the different banding patterns. The procedure is in accordance with Federal Seed Act Regulations section 201.34 d which states, "the variety name shall represent a subdivision of a kind, which is characterized by growth, plant, fruit, seed, or other characters by which it can be differentiated from other sorts of the same kind."

### **References:**

Payne, R. C. and T. J. Koszykowsk, *Electrophoretic differences among field grown plants and cultivars of perennial ryegrass*. AOSA Newsletter (3) 90-93. 1983

Anthony T. Andrews, *Iso-electric focusing in polyacrylamide*; Electrophoresis, Second Edition 9.3, 258-281. 1986

Steven D. Tanksley and Thomas J. Orton, *Isozymes in Plant genetics and Breeding, Part A. Aryl Esterase*, 1983

Payne, R. C. and T. J. Koszykowsk, *Electrophoretic differences among field grown plants and cultivars of perennial ryegrass*. AOSA Newsletter (3) 90-93. 1983

Payne, R. C. and T. J. Koszykowsk, *An Esterase isoenzyme Difference in Seed Extracts of Annual and Perennial Ryegrass*. J. Seed Technol. 5:14-22. 1980

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## NOXIOUS- WEED SEEDS SHOWCASE

Scientific Name: <i>Prosopis</i> spp.	Common Name: Mesquite
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There are 25 species of *Prosopis* on the Noxious-Weed Seed list under the Federal Seed Act. It is an extremely invasive species that can cause severe economic and environmental damage. Plants in the genus *Prosopis* can form large shrubs or taller trees which can lead to impenetrable thickets. Seeds of plants within the genus are dispersed by animals. When seeds are passed through the animals' digestive systems it breaks the seeds' dormancy.

Most species within this genus have deep root systems which thrive in both shallow and deep soil, often taking over space once claimed by other plants. Eradication can be difficult, since plants from the genus can regenerate from a piece of root left in the soil.



Figure 1: *Prosopis denudans* Benth.  
Steve Hurst USDA PLANTS database



Figure 2: *Prosopis campestris*

Scientific name: <i>Mimosa invisa</i> and <i>Mimosa pigra</i>	Common name: Giant false sensitive plant and Giant sensitive plant
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These two *Mimosa* species are invasive in several parts of the United States and other parts of the world. They commonly display very vigorous growth and aggressively displace other plants by means of spiny stems which combine to form tangled thickets.

In some species of *Mimosa*, the fern-like green leaves are 'sensitive' and fold together when touched and at night. The plants' seed pods are covered in hairs which can easily attach to passing animals. The pods also float in water and can travel long distances, making the dispersion of seeds difficult to contain.



Figure 3: *Mimosa invisa* Mart.  
Steve Hurst USDA PLANTS database

Scientific Name: <i>Striga spp.</i>	Common Name: Witchweed
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*Striga spp.* are flowering parasitic plants that attach to the root of a host plant. The species has a serious effect on corn, millet, and sorghum, among others. When the seed germinates and the radicle emerges, it grows to the nearest host root and eventually penetrates the host root's conducting tissues, stealing nutrients from the host. Once it flowers, each plant is capable of producing up to 50,000 seeds. The seeds are extremely small and some species can remain dormant in the soil for 20 years.



Figure 4: *Striga asiatica*

Julie Scher, Federal Noxious Weeds Disseminules, USDA, APHIS, ITP bugwood.org

#### References:

Reed, Clyde. *Economically Important Foreign Weeds - Potential Problems in the United States*. APHIS USDA, 1977.

Holm, LeRoy G., et al. *The World's Worst Weeds Distribution and Biology*. The University Press of Hawaii, 1977.

For information regarding this article, contact Botanist Elizabeth Tatum (704) 810-8873; [Elizabeth.Tatum@ams.usda.gov](mailto:Elizabeth.Tatum@ams.usda.gov)

## **DISTINGUISHING BROWSEED PASPALUM FROM BRUNSWICK GRASS**

Browseed paspalum (*Paspalum plicatulum* Michx.) is considered a native seed and is used in pastures for livestock in Georgia, Alabama, Florida, Mississippi, Louisiana, and Texas (see figure 1; green indicates native kinds). Brunswick grass (*Paspalum nicorae* Parodi) is a seed similar in appearance to browseed paspalum and was introduced into Georgia, Florida and Alabama from South America (see figure 2; blue indicates introduced kinds). The introduction of Brunswick grass has become a problem when found in pastures of Pensacola bahiagrass. Livestock find young Brunswick grass plants palatable, but the plants lose their palatability as they mature. This has assisted in its spread, since livestock avoid grazing on the mature Brunswick grass plants, giving them a competitive advantage over their tastier neighbors.

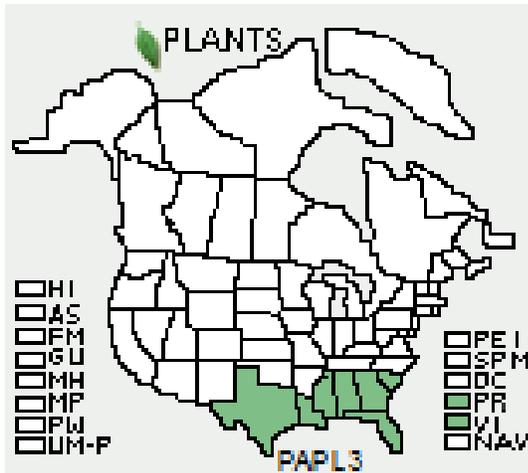


Figure 1: Brownseed paspalum distribution  
USDA National Resources Conservation Service Plants Database

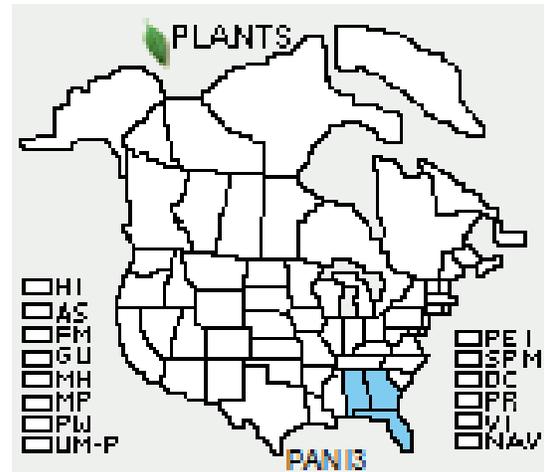


Figure 2: Brunswick grass distribution

The seeds of brownseed paspalum and Brunswick grass are similar in appearance (see figures 3, and 4). The main difference can be seen when viewing the seeds from the palea side. On the brownseed paspalum there is a light tan ring at the edge where the palea and lemma meet (figure 3; seed center bottom palea side). The tan ring runs around the intersection of the lemma and palea from one end of the callus edge to the other. Brunswick grass does not have this tan ring (figure 4; seed center top palea side). However, this characteristic varies with the age of the seed, and cannot always be used to distinguish the two species with certainty.



Figure 3: Brownseed paspalum  
Steve Hurst USDA-NRCS Plants Database



Figure 4: Brunswick grass

Character	<i>P. plicatum</i> Michx.	<i>P. nicorae</i> Parodi
<b>Rhizome</b>	Indistinct (FNA). Sometimes with short rhizome (Chase 1929); short (pachymorphic) (Oliveira 2004).	Long and evident (FNA). Long rhizome (leptomorphic) (Oliveira 2004).
<b>Spikelet length</b>	2.5-3 mm (FNA). 2.1-3 mm (Chase 1929). 2.3-3 (3.3) mm (Oliveira 2004).	2.3-2.7 mm (FNA). 2.4-2.9 mm (Oliveira 2004).
<b>Spikelet width</b>	1.5-2.2 mm (FNA). 1.4-2 mm, commonly 1.8 mm (Chase 1929). 1.5-2 mm (Oliveira 2004).	1.4-1.8 mm (FNA). 1.2-1.8 mm (Oliveira 2004).

Character	<i>P. plicatum</i> Michx.	<i>P. nicorae</i> Parodi
<b>Spikelet shape</b>	Elliptic-ovate (FNA); obovate-oval (Chase 1929); oval, elliptical, elliptical-oval or rarely elliptical obovate (Oliveira 2004)	Elliptic (FNA); oval, obovate or elliptic-obovate (Oliveira 2004)
<b>Lower glume</b>	Absent.	Absent.
<b>Upper glume</b>	Usually with short, appressed pubescence, rarely glabrous, 5-veined, margin entire (FNA). Equal in length to sterile lemma, thin in texture, 5-nerved, glabrous, or the glume often appressed-pubescent (Chase 1929). Upper glume usually longer, rare equal to or shorter, as broad as the upper floret, usually glabrous, rarely with some trichomes or slightly, papery or membranous 3-5 ribs, conspicuous or inconspicuous veins (Oliveira 2004).	Shortly pubescent, 5-veined, margin entire (FNA). Slightly longer or shorter and as broad as the upper floret, hairy, papery, 5-veined, the 3 most conspicuous inner veins meeting at the apex (Oliveira 2004).
<b>Lower lemma</b>	With short, appressed pubescence or glabrous, 3-veined, margin entire (FNA). Equal in length to upper glume, thin in texture, 5-nerved, glabrous, with short transverse wrinkles just inside the slightly raised margin at maturity, rarely sparsely appressed-pubescent (Chase 1929). Length and width equal to or slightly longer than the upper floret, 5-veined, with or without a hyaline portion in the center, pigmented margins, glabrous, papery or membranous, with or without transverse corrugations (Oliveira 2004).	Transversely rugose at maturity, glabrous, 5-veined, margin entire (FNA). Length and width generally equal to the upper glume, glabrous or pilose, papery, 5-veined, usually with a hyaline portion in the center, pigmented margins, occasionally with transverse undulations (Oliveira 2004).
<b>Upper floret</b>	Dark glossy brown (FNA). Nearly the size and shape of the spikelet, dark-brown and shining (Chase 1929). 2.3-3(3.3) mm long, 1.5-2 mm wide, dark-brown without trichomes at the apex of the lemma (Oliveira 2004).	Dark glossy brown (FNA). 2.4-2.9 mm long, 1.2-1.8 mm wide, dark-brown, margins usually lighter in color, glabrous (Oliveira 2004).
<b>Caryopsis</b>	1.4-1.6 mm long, brown (FNA). 1.8-2 mm long, 1.2-1.5 mm wide, elliptical-oval or elliptical-obovate, hilum sub-linear or elongate (Oliveira 2004).	1.8 mm long, 1.4 mm wide, ellipsoidal (FNA). 1.8-1.1 mm long, elliptic, elliptic-elongated hilum (Oliveira 2004).

Figure 5: Comparison of brownsseed paspalum and Brunswick grass seed characteristics. Table prepared by Deborah Meyer, AOSA Purity committee co-chair.

AOSA Rules for Testing Seeds, Vol. 3, Uniform Classification of Weed and Crop Seeds, classifies Brunswick grass as a weed, except when found in rangeland and revegetation seed lots. Bahiagrass (*Paspalum notatum*) is considered an agricultural kind, so any Brunswick grass found in bahiagrass should be classified as a weed. Brownsseed paspalum is classified as a crop in agricultural, range/revegetation, and turf seed lots, and a weed in all other cases. This creates a potential dilemma when an analyst finds a seed in a bahiagrass sample and cannot

positively identify it as brownseed paspalum or Brunswick grass. The AOSA Rules offer the following guidance in this scenario: “When seeds of indistinguishable species are found as contaminants and may be classified either as weed or other crop depending on the species they belong to, they shall be regarded as weeds.” Based on this statement, seeds of one of these species that cannot be distinguished and that are found in bahiagrass samples should be classified as weeds.

Some southern States are considering adding Brunswick grass to their noxious-weed seed lists, due to its negative effects on livestock. This would require a positive identification of any seed found as either brownseed paspalum or Brunswick grass for seed lots being shipped to those States. Dr. Ann Blount at the University of Florida has been studying paspalum species for many years. She indicated that brownseed paspalum does not compete well against bahiagrass, and thus would not likely become established in agricultural fields of bahiagrass. Brunswick grass does compete successfully against bahiagrass and is much more likely to be found in mature stands of bahiagrass. Based on this knowledge of plant characteristics, it is unlikely that brownseed paspalum would reach maturity in a field of bahiagrass and its seeds be harvested along with the bahiagrass seed. Any seed of this type found in a bahiagrass sample is thus most likely Brunswick grass.

References:

*Rules for Testing Seeds*. Stillwater, OK: Association of Official Seed Analysts, 2018. Print.

Blount, Ann. “Brunswick Grass: A Weed Contaminant in Bahiagrass Seed Production Fields.” *University of Florida Panhandle Agriculture* . N.p., 26 Feb. 2016. Web.

For information regarding this article, contact Botanist Charlene Burton (704) 810- 8880; [Charlene.Burton@ams.usda.gov](mailto:Charlene.Burton@ams.usda.gov)

## **SEED DETERIORATION**

Seed deterioration is the irreversible lowering of seed quality after it has reached its maximum germination potential. The maximum seed quality is reached at the seed’s physiological maturity. Seed maturity varies not only by seed kind and composition, but also with seeds within the same seed lot. After maximum seed quality is reached, the seeds begin deteriorating at different rates depending on how they are handled during harvesting, drying, conditioning, and storage.

Physiological and biochemical changes occur in the seed’s embryo and endosperm. These internal changes are not visually detected by the seed analyst, but they can be detected by the way the seed reacts to various laboratory tests. For example, a germination test, vigor test, or biochemical test can show signs of seed deterioration.

One physiological change is the loss of enzyme activity, which can be detected by a biochemical tetrazolium test. Some seeds remain firm and/or dormant at the end of a germination test but the tetrazolium test provides information on whether or not the seed is viable or if the tissues are dead. Some other examples are reduced respiration detected by a respiration quotient (RQ) test, and cell membrane deterioration detected by an electrical conductivity test.

Morphological evidence of seed deterioration includes: discolored seeds such as darkening of the seed coats in legumes, reduced or slow germination, poor seedling growth, increased number of abnormal seedlings such as no primary leaves, poor field performance, and loss of vigor with evidence of slender stems, small leaves, and weak primary roots. Lettuce with signs of cotyledon necrosis and lentils turning yellow after storage are also signs of seed deterioration.

Seed deterioration is difficult to detect because it can be caused by so many factors, especially internal factors that are initially unknown. To help increase seed longevity and reduce seed deterioration, precautions such as controlling the storage relative humidity and reducing the storage temperature are recommended.

For information regarding this article, contact Botanist Anitra Walker (704) 810-7269; [Anitra.Walker@ams.usda.gov](mailto:Anitra.Walker@ams.usda.gov)

## **TESTING BAHIAGRASS FOR FUNGAL INFECTION**

Federal Seed Act (FSA) Regulations require seed analysts to make a number of assessments in determining whether seed is pure or inert. When testing bahiagrass, the analyst must first determine whether the seed contains some degree of endosperm development if the seed is to be classified as pure seed. Pure seed cannot contain fungal bodies which are not entirely enclosed within the seed unit. Determining whether a fungus is present and the degree of fungal development is often difficult using visual examination alone. By using the method outlined below, the analyst can usually find a few seeds that are representative of the varying degrees of fungal infestation in the sample and gain a better understanding of the extent of fungal growth.

Seeds were incubated at 4 different temperatures (25, 50, 75, 95 C) to compare staining. A subsample of 400 seeds was tested per the FSA Regulations by being digested overnight (12-16 hours) in 5.0 % NaOH (2.0 g/L) at room temperature (22-25 C) with stirring. After digestion, seeds were rinsed in deionized water to remove the NaOH. Seeds still had glumes attached and seed coats were still hard and had to be cut opened using scalpels and dissecting needles before embryos could be removed. Embryos were stained with aniline blue prepared per FSA Regulations directions (1 part 1.0 % aqueous aniline blue and 2 parts 85 % lactic acid). However, this stain was too dark and made it difficult to see cellular structures or any fungal hyphae that were inside the embryos even using a microscope.

To achieve results where cell structures were observable, the temperature was raised (allowable under FSA Regulations) and the time of digestion increased to promote softening of seed structures. Seeds were incubated overnight in 5.0 % NaOH at 50 C. After rinsing, glumes had loosened but many were still attached to the seed coat. Seed coats were still hard and embryos had to be removed using tweezers and needles. Aniline blue stain was diluted 50:50 with sterile deionized water. The diluted stain was not too dark and cell structures were visible.

Next, seeds were incubated overnight in 5.0 % NaOH at 75 C. Glumes had separated from most seeds; however, seed coats were still hard and had to be cut before embryos could be removed and determined where the mycelium was located. Lastly, seeds were incubated

overnight as before at 95 C. Glumes separated well from seeds. Seeds were softer and it was easier to remove embryos.

In conclusion, increasing the temperature at which bahiagrass seeds are digested to 95 C overnight can soften the seed coats and make it easier to remove embryos then stain to make any fungal hyphae visible. This method may also be adapted for other grass species when seed coats need to be removed.

For information regarding this article, contact Plant Physiologist Sandra Walker (704) 810-7268; [Sandra.Walker@ams.usda.gov](mailto:Sandra.Walker@ams.usda.gov)

## **FEDERAL SEED ACT AND ARBITRATION**

There are no arbitration requirements under FSA or the Regulations, however, Seed Regulatory and Testing Division (SRTD) may provide mediation assistance for State regulatory agencies, seed companies, or the general public in agricultural and vegetable seed-related disputes.

To help find out which States offer seed arbitration as a part of their seed law, or as a separate law, please visit the Association of American Seed Control Officials (AASCO) website: [http://www.seedcontrol.org/membership\\_directory.html](http://www.seedcontrol.org/membership_directory.html).

To see an example of a recommended seed arbitration statement view the Recommended Uniform State Seed Law (RUSSL): [http://www.seedcontrol.org/pdf/russl\\_2017.pdf](http://www.seedcontrol.org/pdf/russl_2017.pdf). See page 15 which has a recommended seed arbitration statement listed under NOTICE.

For information regarding this article, contact Seed Marketing Specialist Kevin Robinson (704) 810-7264; [Kevin.Robinson2@ams.usda.gov](mailto:Kevin.Robinson2@ams.usda.gov)

## **U.S PATENT NUMBERS AND SEED LABELING Q&A**

Under the Federal Seed Act, could U.S. Patent numbers be included on the seed label?

Yes. Any additional information, other than that required, is permissible as long as the information is truthful and not determined to be misleading. Sections 201.8 under “Labeling Agricultural Seeds” and 201.25 under “Labeling Vegetable Seeds” in the Federal Seed Act Regulations states: “The label may contain information in addition to that required by the Act, provided such information is not misleading.”

Examples of statements on the label could include:

- 1) U.S. Patent number XXXXX
- 2) Contains ryegrass at the rate of XX seeds per pound

For information regarding this article, contact Seed Regulatory Supervisor Roger Burton (704) 810-7265; [Roger.Burton@ams.usda.gov](mailto:Roger.Burton@ams.usda.gov)

## **FEDERAL SEED ACT MINIMUM GERMINATION STANDARDS**

FSA minimum germination standards apply only to vegetable seed packaged in containers consisting of one pound or less. Germination standards are found in the FSA Regulations 201.31 and shall be construed to include hard seed. The minimum germination standards are found under section 403(c) of the FSA.

There are many States that have minimum germination standards for agricultural and flower seeds incorporated into their seed laws and/or regulations. Information regarding minimum germination standards for agricultural and/or flower seed can be obtained from the State seed control official. A list of current seed control officials and their contact information can be found here: [http://www.seedcontrol.org/membership\\_directory.html](http://www.seedcontrol.org/membership_directory.html).

For information regarding this article, contact Seed Regulatory Supervisor Roger Burton (704) 810-7265; [Roger.Burton@ams.usda.gov](mailto:Roger.Burton@ams.usda.gov)

## **SALE OF UNCERTIFIED SEED OF PROTECTED VARIETIES**

When a Plant Variety Protection (PVP) Certificate indicates that seed of a particular variety is to be sold by variety name only as a class of certified seed, the variety then becomes subject to the provisions under Title V of the Federal Seed Act (FSA). Section 501 under Title V of the Federal Seed Act (FSA) states, "It shall be unlawful in the United States or in interstate or foreign commerce to sell or offer for sale or advertise, by variety name, seed not certified by an official seed certifying agency, when it is a variety for which a certificate of plant variety protection under the Plant Variety Protection Act specifies sale only as a class of certified seed: Provided that seed from a certified lot may be labeled as to variety name when used in a mixture by, or with the approval, of the owners of the variety."

A Title V variety must be a class of certified seed to be advertised or sold by variety name. Selling the seed as 'variety not stated (VNS)' in order to not list the seed as a certified seed is a violation of FSA Section 501. This violation of the FSA applies to both intrastate and interstate advertising, sales, and shipments.

Seed produced from a PVP variety cannot be sold, advertised, offered, delivered, consigned, exchanged or exposed for sale without explicit authorization by the proprietary seed owner. Enforcement of the PVP law which differs from Title V is left up to the owner of the PVP variety through civil court action. If there is a violation, all parties involved can be included in the lawsuit. This includes the buyer, seller, and seed conditioners/cleaners. Even the entity planting the seed for the farmer can be held liable.

This is an expansion on Title V article that was published by Seed Marketing Supervisor Roger Burton in the October 2007 edition of Items of Interest in Seed.

For information regarding this article, contact Seed Marketing Specialist Rodney McNeace (704) 810-8879; [RodneyB.McNeace@ams.usda.gov](mailto:RodneyB.McNeace@ams.usda.gov)

## **TRUENESS-TO-VARIETY (TTV) OVERVIEW**

Each year Seed Regulatory and Testing Division (SRTD) conducts trueness-to-variety (TTV) field tests to determine if seed lots are properly labeled for variety, as required by the Federal Seed Act and State seed laws. Field testing is conducted by crop experts at State universities and State departments of agriculture in cooperation with SRTD. SRTD relies on State seed control programs to submit samples for inclusion in the TTV tests.

SRTD conducted TTV tests on sorghum at the Sandhills Research Station in Jackson Springs, NC, and on pea, radish, spinach, and squash at the Piedmont Research Station in Salisbury, NC. Also, SRTD planted tall fescue samples at the Sandhills Research Station in Jackson Springs, NC to be evaluated in the upcoming spring 2019.

SRTD would like to thank the States which participated in the TTV program. Once results and information have been compiled, participating States will be notified of any mislabeling.

For questions concerning the TTV program or directions for submitting samples, contact Seed Marketing Specialist Akhtar A. Kazmi (704) 810-8878; [Akhtar.Kazmi@ams.usda.gov](mailto:Akhtar.Kazmi@ams.usda.gov)

## **FEDERAL SEED ACT CASES SETTLED**

The Federal Seed Act (FSA) provides authority for the regulation of the interstate shipments of agricultural and vegetable seeds. The FSA requires that seed shipped in interstate commerce are labeled with certain information necessary for the seed buyer to make an informed choice. The labeling information and any advertisements pertaining to the seed must be truthful. Between September 1, 2017, and August 31, 2018, a total of 30 seed companies paid \$94,000 to settle alleged violations of the FSA.

For specific information regarding these violations, please visit <https://www.ams.usda.gov/rules-regulations/fsa> then [Filing a Complaint](#) and [View a list of settled FSA Cases](#). USDA's Agricultural Marketing Service (AMS) administers the FSA by leveraging its resources with State departments of agriculture. These investigations were a result of joint efforts with seed regulatory officials in Arkansas, Florida, Georgia, Indiana, Kentucky, Missouri, Pennsylvania, Tennessee, Texas, Virginia, and West Virginia. By working collaboratively with State partners, SRTD helps promote uniformity among State seed laws and fair competition within the seed trade through the enforcement of the FSA.

For information regarding this article, contact Seed Marketing Specialist Kevin Robinson (704) 810-7264; [Kevin.Robinson2@ams.usda.gov](mailto:Kevin.Robinson2@ams.usda.gov)

## **STATE NOXIOUS-WEED SEED LIST UPDATING PROCESS**

Seed Regulatory and Testing Division (SRTD) staff are responsible for revising the "State Noxious-Weed Seed Requirements Recognized in the Administration of the Federal Seed Act," in close cooperation with State seed control officials.

Adding or removing species to the Noxious-Weed Seed list is not a simple process. Most States require the revisions to their seed law to be approved by their State legislatures or Commissioner/Secretary of Agriculture. Once the revision is approved, the State seed control officials notifies SRTD of the change. The publication is only updated when SRTD receives the official requests from the States. It is up to the State to determine what species are placed on the list.

A yearly notice from SRTD is sent to the State seed control officials requesting updates and modifications to their State Noxious-Weed Seed list. Previously, the publication was updated once a year. Now to better serve and support the industry, SRTD will update the Noxious-Weed Seed list as soon as we receive the information from the State seed control officials. However, SRTD is unable to guarantee that there will not be any discrepancies between this publication and State seed laws. Therefore, it is recommended that the seed dealers know the current requirements of State laws to ensure they are in compliance.

SRTD appreciates the State seed control officials' efforts in sending updates, since the publication is essential in helping the seed industry maintain compliance with FSA and protecting consumers nationwide. Please contact SRTD if there are any discrepancies between this publication and State seed laws.

For detailed information, please refer to the introductory page of the State Noxious-Weed Seed List at [www.ams.usda.gov/rules-regulations/fsa](http://www.ams.usda.gov/rules-regulations/fsa)

For information regarding this article, contact Seed Marketing Specialist Lan Chi Trinh (704) 810-7272; [Lan-ChiN.Trinh@ams.usda.gov](mailto:Lan-ChiN.Trinh@ams.usda.gov)

## **SEED REGULATORY AND TESTING DIVISION SEED ANALYSTS TRAINING WORKSHOP**

Seed Regulatory and Testing Division (SRTD) held a Seed Analysts Training Workshop in Gastonia, NC on August 13-15. Fifteen seed analysts from 8 State laboratories and 4 seed analysts from public or private laboratories attended. The workshop focused on purity and identification of similar crop and weed species, with emphasis on identification of noxious-weed seeds. Other topics included: seed and seedling structures, germination and botany terms, grass mixture separations, uniform blowing procedure and various calculations. This year also featured presentations about endosperm development, coated seed units and tetrazolium testing.

Following the workshops, the purity and germination exams were given to analyst who desire to become either a Certified Seed Analyst (CSA) or a Registered Seed Technologist (RST). This year there were five AOSA analysts and one SCST analyst that took the purity and germination exam.

The mission of the Federal Seed Act is to promote uniformity in seed laws and fair competition within the seed industry. This effort is supported by State seed control programs through authorization provided by cooperative agreements between the States and the USDA's Agricultural Marketing Service (AMS). This SRTD workshop, promotes uniformity in testing and by fostering greater compliance with State and Federal seed-labeling laws.



From L to R: Nate Wilder (NC), Redell Turnage (NC), Bouchra ElGarib (PA), Ian Ingram (AL), Raynordra Jones (AL), Tera Davis (Syngenta), Duane Smith (UT), Roopa Anantareddy (PA), Edna Delina (Incotec), Pam Bridgeman (WY), Jill Rice (WY), William Thompson (NC), Charlene Burton (SRTD), Anitra Walker (SRTD), Todd Erickson (SRTD), Jeff Brockman (HM Clause), Valeria Silva (HM Clause)

For information regarding this article, contact Botanist Patsy Jackson (704) 810-8881; [Patsy.Jackson@ams.usda.gov](mailto:Patsy.Jackson@ams.usda.gov)

## **OECD SEED SCHEMES ANNUAL MEETING**

U.S Organization for Economic Cooperation and Development (OECD) Seed Schemes Program Manager Dr. Steve Malone represented the United States at the OECD Seed Schemes Ad Hoc Working Group (AHWG) & Technical Working Group (TWG) meetings held January 30-February 2 at the OECD Headquarters in Paris, France. Dr. Malone also represented the United States at the Working Group meetings and annual meeting on June 26-29, also in Paris. Alan Galbreth, CEO of Indiana Crop Improvement Association, represented the American Seed Trade Association (ASTA). Dan Curry, Director of Seed Services at Oregon State University, represented the Association of Official Seed Analysts (AOSA) at both meetings.

AHWGs are established to study specific seed schemes topics as needed, while TWGs are standing committees that continually evaluate seed schemes rules and guidelines that facilitate the international movement of seed. The TWG make recommendations at the annual meeting. Decisions to change rules and guidelines of the schemes are determined by consensus of the official country delegates during the annual meeting. Those decisions become final upon concurrence by the OECD Committee on Agriculture and the OECD Council.

The annual meeting began on a sad note, when it was announced that Dr. Hermann Freudenstein, the NDA from Germany, had passed away the previous week after an intense battle with liver cancer. Dr. Hermann was well respected by members of the seed schemes. Delegates observed a moment of silence in his honor.

#### Outcomes of the annual meeting:

- Approval of 3 proposed rule changes that collectively expand the certification of seed mixtures. The most notable impact is that the rules will now allow for the mixtures of certified seed to include maize (corn). This includes the use of corn in blends for herbage purposes as well as Integrated Refuge blends.
- Adoption of the Action Plan based on the Strategic Plan that was approved in 2017. Both plans are more streamlined and focused than those they replaced.
- Approval of a training module slide deck on field inspection in certification and a more specific one for maize field inspections. This will be used for training staff in participating countries, and potentially in capacity building activities in other countries through the World Seed Partnership.
- Agreement to continue the notification process for critical issues for the next two years on a trial basis to determine if this will provide sufficient information to understand the extent and nature of problems in implementation of the schemes, or areas where seed schemes rules and guidelines need additional clarity.
- Addition of *Bromus parodii* (Covas et Itria), *Bituminaria bituminosa* var. *albomarginata*, and var. *crassiuscula* to the Grass and Legumes Seed Scheme.
- Establishment of a new AHWG to develop guidelines for the acceptance of varieties derived by unique hybridization methods such as those employed for production of hybrid barley, wheat, *Lolium* spp., and others that may come along in the future. The United States representative will serve as chair of this new AHWG.

#### Ongoing discussions to be continued by Ad Hoc and Technical Working Groups:

- The AHWG on labelling continues to gather information on methods for prevention of counterfeiting but no firm proposals for new rules have been developed. The labelling working group will continue to collect information from participating countries on additional official and non-official information allowed on labels with the goal of clarifying the rules. Through surveys of member countries, the secretariat is building a catalog of label security measures employed by participating countries in hopes that effective strategies will be adopted by other countries. This has been expanded to label attachment methods and tracking systems. Use of staples is still a contentious issue. The labeling working group is continuing to make sure that it remains an option while exploring viable alternatives that will work for our international shippers. The current direction is to develop a set of best practice guidelines to ensure the integrity of OECD labels rather than focusing on specific requirements which would require rule changes. The United States position is to support this direction.
- Work continues on the recognition of various biochemical and molecular techniques for assessing varietal identity and purity in partnership with seed analyst organizations such as Association of Official Seed Analysts and the International Seed Testing Association. While not fully considered an endorsement or approval, there was agreement to recognize those biochemical methods that are used by various countries as legitimate and refocus the AHWG more specifically on currently used and future genetics based methods.

In 2019, the TWG will meet January 28 – February 1 in Buenos Aires, Argentina. The annual meeting is scheduled for June 10-14, 2019 in Vienna, Austria.

For information regarding this article, contact OECD Program Manager Steve Malone (704) 810-8888; [Stephen.Malone@ams.usda.gov](mailto:Stephen.Malone@ams.usda.gov)

For more information on the OECD Seed Schemes, go to <http://www.ams.usda.gov/rules-regulations/fsa/oecd-schemes> or <http://www.oecd.org>.

## **INTERNATIONAL SEED TESTING ASSOCIATION 2018 MEETING**

Seed Regulatory and Testing Division (SRTD) Director Ernest Allen participated in the annual meeting of the International Seed Testing Association (ISTA), June 11-14, 2018, in Sapporo, Japan. In addition to Mr. Allen, several other United States ISTA members attended the meeting, including Dr. Melanie Schori of the USDA Agricultural Research Service and Victor Vankus of the USDA Forest Service.

During the meeting, ISTA committees provided updates on current and future projects, finalized projects and rule proposals submitted by technical committees. As the incoming Chair of the ISTA rules committee, Mr. Allen gave the report on rules committee activities in the open rules committee meeting and led a separate discussion evaluating the merits of each proposal presented for possible inclusion in the 2019 rules. Dr. Schori participated in the Nomenclature committee meeting which focused on discussions concerning updating of the ISTA Stabilized List for 2019. The [ISTA Stabilized List](#) is primarily derived from the USDA Germplasm Resources Information Network. Victor Vankus was nominated by the Forest Tree and Shrub committee to lead author the chapter covering tree seed tetrazolium tests. Committee reports can be viewed on [ISTA Web site](#).

At the Ordinary Meeting on June 14, Ernest Allen served as the voting delegate on behalf of the Agricultural Marketing Service, which is the United States Designated Authority to ISTA. Of ISTA's 64 national designated authorities (NDA) from countries around the world, 28 were represented at the meeting. The NDA's present at the meeting exceeded the required quorum for voting. ISTA President, Craig McGill (New Zealand), gave the welcome address and chaired the Ordinary Meeting.

Decisions of the Ordinary Meeting:

- The membership voted to amend the ISTA Articles by changing how the quorate is calculated for voting at the annual meeting. Currently, each designated authority (DA) is required to nominate a member to vote on its behalf at each meeting. There are cases where the DA does not nominate a member but the country is still included in the quorum calculation, which increased the difficulty in reaching a quorum. The approved change will only include nominated members in the count for a quorum.
- ISTA annual membership fees for 2019 will remain unchanged. No increase was proposed by the Executive Committee or the Secretariat of the organization.
- The Membership voted to waive the registration fee for Executive Committee members to attend ISTA Annual Meetings and congresses. Executive Committee members and Technical Committee chairs volunteer for substantial work for ISTA throughout the year

and attends the meetings each year as a representative of the organization. This fee is already waived for TCOM chairs.

- Excluding editorial changes, there were a total of 21 proposals submitted to the membership for vote. Notable approved rule changes which will take effect January 1, 2019, include the following:
  - Add three new species (*Aeginetia*, *Alectra*, and *Striga*) to the procedures used to detect seeds of dust-like parasitic weeds. Currently, only *Orobanche* can be reported using the procedures in section 4.5.3 *SRTD voted to accept this rule.*
  - Add new evaluation criteria for the root system of *Spinacia oleracea*. 5.2.7.2 "... for *Spinacia oleracea*, the length of the primary root must be equal to or greater than half the length of the hypocotyl." *SRTD received significant concerns from U.S. stakeholders regarding this proposal. Primarily concerning the strength of the validation study. SRTD voted not to accept this rule.*
  - Revisions made throughout Chapter 10 (Weight Determination) to reduce repetitiveness and increase clarity. *SRTD voted to accept this rule.*
  - Add additional chickpea types to the conductivity test by removing the specific "Kabuli type" reference from the rules. 15.3 "...Conductivity Test: *Cicer Arietinum* (~~Kabuli type~~), *Glycine max*, *Phaseolus vulgaris*,..." *SRTD voted to accept this rule.*
  - Three proposals submitted by the ISTA Bulking and Sampling committee related to sampling intensity (2.5.1.2) and seed lot size (2.5.4.1.b) were withdrawn. They will be revisited by the committee at a later time.
  - For a complete list of changes approved during the Ordinary meeting please visit the ISTA website at [www.seedtest.org](http://www.seedtest.org).

Next year's ISTA meeting is scheduled for June 26 - July 3, 2019, in Hyderabad, India.

For information regarding this article, contact SRTD Director Ernest Allen (704) 810-8884; [Ernest.Allen@ams.usda.gov](mailto:Ernest.Allen@ams.usda.gov)

## **ASSOCIATION OF OFFICIAL SEED ANALYSTS – SOCIETY OF COMMERCIAL SEED TECHNOLOGISTS ANNUAL MEETING**

The 2018 Joint Annual Meeting of the Association of Official Seed Analysts (AOSA) and the Society of Certified Seed Technologists (SCST) was held June 4-June 7 in Raleigh, NC. Four members of Seed Regulatory and Testing Division (SRTD) represented the USDA's Agricultural Marketing Service.

Staff from SRTD gave several presentations, moderated committee meetings, and participated in other activities throughout the meeting. SRTD Director Ernest Allen gave a presentation on SRTD activities over the past year. Chi Trinh presented her referee project dealing with bahiagrass testing and discussed results with AOSA/SCST members. During the open rules discussion, Elizabeth Tatum and Todd Erickson answered questions pertaining to SRTD's rule proposal which involves dividing coated seed mixtures.

There were 17 rule proposals all of which passed by vote. They included:

- a paragraph to emphasize the need for laboratories to be properly equipped,

- pure seed unit definitions, chaffy seed designation, and working weights for several new species and,
- an alternative method to evaluate the grow-out test of fluorescent ryegrass.

A complete listing of the 2018 rule proposal voting results can be found on the AOSA and SCST websites at <http://www.analyzeseeds.com/annual-meeting-proceedings/>.

For more information on this year's meeting, please visit [www.analyzeseeds.com](http://www.analyzeseeds.com). The 2019 annual meeting is scheduled for June 1-6, in Sparks, NV.

For information regarding this article, contact Botanist Elizabeth Tatum (704) 810-8873; [Elizabeth.Tatum@ams.usda.gov](mailto:Elizabeth.Tatum@ams.usda.gov)

### **ASSOCIATION OF OFFICIAL SEED CERTIFYING AGENCIES ANNUAL MEETING**

The Association of Official Seed Certifying Agencies (AOSCA) held its 99<sup>th</sup> Annual Meeting on June 24-27, 2018, in Atlanta, Georgia. AOSCA was established in 1919 and consists of agencies from United States, Canada, Argentina, Brazil, Chile, Australia, New Zealand and South Africa.

Seed Regulatory and Testing Division (SRTD) Director Ernest Allen and Seed Marketing Specialist Lan Chi Trinh represented SRTD at the meeting. Mr. Allen updated the organization on the USDA position regarding gene editing technology. Mr. Allen also presented an outline of recent SRTD activities to the AOSCA Advisory Committee. Ms. Trinh gave updates on the U.S. OECD Program activities.

Other items of general interest included:

- The Small Grain/Rice Committee reported on the contrasting market class in wheat and the results from the red and white wheat High Performance Liquid Chromatography (HPLC) ongoing study.
- The Soybean/Dry Bean Committee presented the proposed standards for chickpea, which the Standard Council later passed.
- The Industrial Hemp Committee presented the updated standards for industrial hemp.
- AOSCA will celebrate their 100<sup>th</sup> Anniversary in 2019 in Chicago, IL.

For information regarding this article, contact Seed Marketing Specialist Lan Chi Trinh (704) 810-7272; [Lan-ChiN.Trinh@ams.usda.gov](mailto:Lan-ChiN.Trinh@ams.usda.gov)

## 32<sup>ND</sup> ANNUAL MEETING OF THE ASSOCIATION OF AMERICAN SEED CONTROL OFFICIALS

The Association of American Seed Control Officials (AASCO) held its 32<sup>nd</sup> Annual Meeting on July 15-19, 2018, in Des Moines, Iowa. The meeting was hosted by Iowa Department of Agriculture. Representatives from 24 State seed control programs, the American Seed Trade Association (ASTA), the Association of Official Seed Analyst (AOSA), the Society of Commercial Seed Technologist (SCST), and ten industry representatives attended the meeting.

Seed Regulatory Supervisor Roger Burton and Seed Marketing Specialist Lan Chi Trinh represented Seed Regulatory and Testing Division (SRTD) at the meeting. In the opening session, Roger Burton gave a report on 2017-2018 Federal Seed Act (FSA) activities and SRTD updates. Other presentations included Jane DeMarchi (ASTA) "NRCS Seed Standards", Mike Stahr (AOSA) "Uniformity", Dave Stimpson (SCST) "Turning Point of AOSA/SCST", and Anita Gilmer (CFIA) "Weed Seed Order and *Cannabis sativa* Legalization in Canada."

In the general session, Lan Chi Trinh gave a presentation on "Seed Samples, Chain of Custody, Handling & Shipping" and a presentation on "Federal Seed Act Training for State Seed Control Officials." Roger Burton gave a presentation on "Working with PVPO and SRTD." Johnny Zook (PA) and Roger Burton gave a presentation on "Treating/Coating/Repackaging of Seed Having been Previously Certified."

Other discussions included:

- "Accredited Sampler Training" by Jim Drews (MD)
- "Germination Standards for Vegetable" by Johnny Zook (PA)
- "Going Paperless from Inspection to Testing" by Don Robison (IN)
- "Kentucky 31 Tall Fescue Issues" by Nate Miller (OR)
- "Spiral Probe Causing Damage to the Seeds" by Jim Drews (MD)
- A proposal by Greg Helmbrecht (Treasurer) to approve the Board of Directors to look into the option of professional production and online testing for Basic Inspector Training Seminar (BITS) format.

The current AASCO officers are:

- President Johnny Zook (PA)
- First Vice-President Jason Goltz (ND)
- Second Vice-President Jeff Claxton (TX)
- Treasurer Greg Helmbrecht (WI)
- Secretary Don Robison (IN)
- Past President Jim Drews (MD)

The 2019 AASCO Annual Meeting will be held in Texas. Meeting dates and location information will be announced at a later date. For more information about AASCO, visit their website at [www.seedcontrol.org](http://www.seedcontrol.org).

For information regarding this article, contact Seed Marketing Specialist Lan Chi Trinh (704) 810-7272; [Lan-ChiN.Trinh@ams.usda.gov](mailto:Lan-ChiN.Trinh@ams.usda.gov)

## CALENDAR OF EVENTS

Event	Dates
Organization for Economic Cooperation and Development (OECD) Seed Schemes Technical Working Group Meetings Buenos Aires, Argentina	January 28 - February 1, 2019
American Seed Trade Association (ASTA) Vegetable and Flower Seed Conference Orlando, FL	February 2 - 5 , 2019
Association of Official Seed Analysts/ Society of Commercial Seed Technologist (AOSA/ SCST) Annual Meeting Sparks, NV	June 1 - 6, 2019
Organization for Economic Cooperation and Development (OECD) Seed Schemes Annual Meeting Vienna, Austria	June 10 - 14, 2019
American Seed Trade Association (ASTA) Policy and Leadership Development Conference Denver, CO	June 15 - 19, 2019
Association of Official Seed Certifying Agencies (AOSCA) Annual Meeting, 100 <sup>th</sup> Anniversary Chicago, IL	June 23 - 26, 2019
International Seed Testing Association (ISTA) Annual Meeting Hyderabad, India	June 26 - July 3, 2019
SRTD Seed School Gastonia, NC	August 2019
ASTA Farm and Lawn Seed Conference Kansas City, MO	TBD
ASTA Corn Soybean & Sorghum (CSS) Conference Chicago, IL	December 9 - 12, 2019

## **Seed Regulatory and Testing Division (SRTD) STAFF DIRECTORY**

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