Rick Novak
Director of Colorado Seed Programs

Seed Certification
Seed Testing & Labeling
Colorado Seed Growers Association

Function

• To adopt and implement Seed Certification standards that help maintain the pedigree of a specific variety. We provide verification and documentation of the process.

• Varietal purity is our first consideration, but other factors such as weeds, diseases, viability, and mechanical purity are also components of the Certification process.
SEED CERTIFICATION NOMENCLATURE AND LABELING FOR PLANT GERMPLASM TYPES

Plant Species Population

Germplasm Accession

Germplasm Accession

Germplasm Accession

"Manipulated-Track"

"Natural-Track"

Source Identified Class
(unrestricted natural accessions)

YELLOW TAG
G0, G1, G2, G3...

trait comparison and selection among accessions

Immediate Use

UNTESTED

GEORGIC ADAPTATION/MAINTENANCE POTENTIAL

Proven

PROOF TESTING; traits proven hentable

Selected Class
(breeding lines, clonal groups, manipulated accessions)

GREEN TAG
G0, G1, G2, G3...

multiple location/year testing

Purposeful or Unplanned Genetic Manipulation

Tested Class
(introduced, synthetics, manipulated accessions)

BLUE TAG
G0, G1, G2, G3...

Varity/Cultivar
(uniform and stable germplasm)

WHITE TAG: B, F
PURPLE TAG: R
BLUE TAG: C

Developed Time Frame

Multiple Data Harvests

Purposive or Unplanned Genetic Manipulation

Selected Class
(breeding lines, clonal groups, manipulated accessions)

GREEN TAG
G0, G1, G2, G3...

multiple location/year testing

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Native Plant Connection

Large-scale natural and human-caused ecosystem disturbances generate a voluminous demand for native plant reproductive materials intended for restoration, revegetation and stabilization of natural communities.

AOSCA has implemented certification requirements and standards that accommodate plant germplasm of native grasses, forbs and woody plants.

AOSCA seed certification agencies (acting as a third party) require seed collectors/producers to follow established requirements, procedures and standards to assure seed native plant restoration, revegetation and stabilization identity and purity for the consumer.

Download a PDF version of the AOSCA Native Plant Connection booklet for native plant restoration, revegetation and stabilization certification procedures.
“Seed Quality” is measured by:

- Seed Viability (broad term)
- Tetrazolium (TZ)
- Germination (time sensitive)
- Dormancy ?
- Pure Seed
- Other Crop ?
- Weed Seed (common & Noxious)
- Inert Matter
About

Overview:

The Association of Official Seed Analysts (AOSA) is an organization of member laboratories. Members include official state, federal, and university seed laboratories across the United States and Canada. To assure a high standard of quality, many individuals within the AOSA member laboratories have acquired AOSA Certified Seed Analyst status through extensive training followed by a mandatory certification testing process.

Primary Functions:

- Establish the AOSA Rules for Testing Seeds which are generally adopted by most states as the rules for testing seeds in their respective states
- Contribute to the refinement and modification of the rules and procedures for seed testing. Ensure that testing procedures are standardized between analysts and between laboratories
- Influence and assist in enforcement of appropriate seed legislation at state and federal levels

Membership is extended to allied laboratories (those of government agencies and institutions outside the associate members (individuals not assigned to a member laboratory but contribute in a supportive role), and honorary members (those who have distinguished themselves in contributions to the Association and/or industry).

History:

AOSA was formed in 1908 in response to initial attempts by individual states to develop seed laws. This was the beginning of regulated seed commerce in the United States. Initial priorities included, as was defined in the constitution, an attempt to seek uniformity and accuracy in methods, results, and reports. It set as its objective an effort to perfect and make publicly known, through publication, uniform rules for seed testing.

http://www.aosaseed.com/
Seed Viability

• A broad term used to indicate if the seed contains structures and substances that give it the capacity to germinate under favorable conditions in the absence of dormancy.
Germination

• Is defined as the emergence from the seed embryo of those essential structures which, for the kind in question, are indicative of the ability to produce a normal plant under favorable conditions.
Seed Dormancy

• This term defined as a seed failing to germinate under environmental conditions optimal for germination, normally when the environment is at a suitable temperature with proper soil moisture.

• Physical dormancy or hard seed coats, occurs when seeds are impermeable to water.

• Chemical dormancy, considers species that lack physiological dormancy, but where a chemical prevents germination.

• Morphophysiological dormancy, seeds with underdeveloped embryos, and also have physiological components causing dormancy.

• Physiological dormancy, means the embryo, due to physiological causes, cannot generate enough power to break through the seed coat.

• Photodormancy, or light sensitivity affects germination of some seeds. These seeds need a period of darkness or light to germinate.

• Thermodormancy, Seed that has sensitivity to heat or cold to germinate.

“Dormancy is necessary for species survival”
Tetrazolium (TZ)

Tetrazolium chloride, water soluble colorless chemical used to determine seed viability. In respiring tissues, dehydrogenase enzymes reduces TZ to form a water insoluble reddish compound, Formazan. This test cannot be used for labeling all seed in Colorado only those without AOSA tests.
Purity Terminology

**Purity** – “The analysis performed, on the kind in question, to determine the percentage of pure seed, other crop seed, weed seed and inert material present in the seed lot." -as defined in the AOSA Rules and reported in percentage of the sample weight.

**Pure Seed**
**Other Crop Seed**
**Inert Matter**
**Weed Seed**
Common & Noxious Weeds

• Test to determine weed contaminants, bulblets or tubers of individual noxious weeds by weight. This test determines presence in the sample content of:

  • Prohibited Noxious Weeds (none allowed)
  • Restricted Noxious Weeds (restricted quantity)

• Refer to the Colorado Weed List (handout)
“Seed Law”
Standard Format for Seed Labeling

Variety
Kind
Genus / Species
Purity Analysis
Viability Analysis
Other Crop Seeds
Weed Seeds
Noxious Weed Seeds
Test Date
Remarks
"Seed Law"
Standard Format for Seed Analysis Report

Variety
Kind
Genus / Species
Purity Analysis
Viability Analysis
Other Crop Seeds
Weed Seeds
Noxious Weed Seeds
Remarks
Signature

COLORADO SEED LABORATORY
Dept. of Soil & Crop Sciences, Colorado State University, Ft. Collins, CO 80523
REPORT OF SEED SAMPLE ANALYSIS

<table>
<thead>
<tr>
<th>Account No.</th>
<th>Date Received</th>
<th>Date Completed</th>
<th>Lab Number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>09/11/14</td>
<td>09/15/14</td>
<td></td>
</tr>
</tbody>
</table>

*Sender's Information:*
- Variety/Product: AP503 CL2
- Kind: Wheat, hard red winter
- Genus/Species: *Triticum aestivum*
- Lot Number: Class

*The information provided here is that of the sender and not of the laboratory.*

**Purity Analysis**

<table>
<thead>
<tr>
<th>Pure Seed Components</th>
<th>Purity</th>
</tr>
</thead>
<tbody>
<tr>
<td>In 101.333 grams.</td>
<td></td>
</tr>
<tr>
<td>Wheat, hard red winter</td>
<td>98.68%</td>
</tr>
<tr>
<td>Purity Grams Required</td>
<td>Germination</td>
</tr>
<tr>
<td>100 Weed Seed</td>
<td>90</td>
</tr>
<tr>
<td>500 Crop Seed</td>
<td>-N-</td>
</tr>
<tr>
<td>Grams Grown</td>
<td>2183 Inert Matter</td>
</tr>
</tbody>
</table>

**Viability Analysis**

<table>
<thead>
<tr>
<th>Germ Date</th>
<th>Germination %</th>
<th>Dormant %</th>
<th>Hard %</th>
<th>Total Viable</th>
</tr>
</thead>
<tbody>
<tr>
<td>08/25/14</td>
<td>90</td>
<td>-N-</td>
<td>-N-</td>
<td>90</td>
</tr>
</tbody>
</table>

**Other Crop Seeds**

- None Found

**Noxious Weed Seeds**

- None Found
- States: WY
- In 900 Grams

**Weed Seeds**

- Bromo, downy: *Bromus tectorum* 9 per lb

**Other Determinations**

- Seed count: 19,485 Seeds/ft

**Remarks**

- Sample has passed the CLEARFIELD CONFIRM SM Test
- Tests Requested: Purity, Germination, Seed count, Clearfield. No other tests requested.

**WARRANTY:** The Association warrants that the purity and germination test results reported on this form have been carried out in accordance with AOAC rules unless otherwise specified. Test results reflect the condition of the submitted sample and may not reflect the condition of the seed lot from which the sample was taken.

**DISCLAIMER OF WARRANTIES:** The Association makes no other warranties of any kind, expressed or implied, including but not limited to the implied warranties of merchantability or fitness for a particular purpose.

**Signature:** [Signature]

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Thank You