Certification of Wildland Seed
Source Identification & Beyond

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Seed Program Manager
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Seed Certification: NDA Overview

• Department of Agriculture’s Role
  – Official Seed Certifying Agency for the State of Nevada.
  – Authorized through state statute to conduct quality assurance services related to seed commerce.
    • Nevada Revised Statute (NRS) 587
    • Nevada Administrative Code (NAC) 587
  – Association of Official Seed Certifying Agencies (AOSCA) Accredited
    • “Yellow Book”
Certified Seed: Defined

• Formally recognized seed that has been determined to possess stable characteristics relating to:
  – Purity
    • The ability for a seed crop to possess little to no contaminants
      – Examples: Weeds, off-types, other crops, etc.
  – Identity
    • The ability for a seed crop to maintain its varietal features from one generation to the next.
      – Examples: Physiology, resistance, vigor, viability, adaptability, etc.
Pathway to Certification

- **Manipulated**
  - Breeder*
  - Foundation
  - Registered
  - Certified

- **Natural**
  - Source ID
  - Selected
  - Tested
  - Cultivar*

*Breeder seed is the original source of all classes of certified seed. It is controlled by the original plant breeder, or institution, to ensure maintenance for genetic purity and identity.

*Cultivars are developed after stringent rounds of testing, or selective breeding, to determine the species is genetically stable and pure. Cultivars should consistently exhibit secure characteristics from one generation to the next.
Track Distinction and Relations
Cultivated Certification: Track 1

• Cultivated (Manipulated) Track
  – Traditionally reserved for agricultural commodities
    • Alfalfa, small grains, corn, potatoes, etc.
  – Begins with the BREEDER
    • After intensive rounds of breeding and trait selection, varieties are selected and admitted to a Varietal Review Board (VRB)
    • If designated as an officially recognized breeder seed, the track to certification can begin.
    • Breeder → Foundation → Registered → Certified
The Association of Official Seed Certifying Agencies

“Yellow Book”

Develops standards pursuant to each “crop” type and designation.

- Standards relate to overall crop quality:
  - Off-type presence
  - Weed presence
  - Pathogenic infection
  - Lot purity/viability
Field/Lot Standards: Crop Example

**Small grain standards pursuant to class designation**

<table>
<thead>
<tr>
<th>NAC 587.286</th>
<th>Maximum Permitted in Each Class of Small Grain: Field (Ratio Of Plants)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor</strong></td>
<td><strong>Foundation</strong></td>
</tr>
<tr>
<td>Other Varieties</td>
<td>None</td>
</tr>
<tr>
<td>Other Small Grains</td>
<td>None</td>
</tr>
<tr>
<td>Wild Oats</td>
<td>None</td>
</tr>
<tr>
<td>Smut</td>
<td>1:10,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NAC 587.288</th>
<th>Standards for Classes of Small Grains: Lot</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor</strong></td>
<td><strong>Foundation</strong></td>
</tr>
<tr>
<td>Pure Seed (Min)</td>
<td>98.00%</td>
</tr>
<tr>
<td>Other Crop (Max)</td>
<td>None</td>
</tr>
<tr>
<td>Other Small Grain (Max)</td>
<td>None</td>
</tr>
<tr>
<td>Weed Seed (Max)</td>
<td>0.01%</td>
</tr>
<tr>
<td>Noxious Seed (Max)</td>
<td>None</td>
</tr>
<tr>
<td>Objectionable Seed (Max)</td>
<td>None</td>
</tr>
<tr>
<td>Inert Matter (Max)</td>
<td>2.00%</td>
</tr>
<tr>
<td>Ergot (Max)</td>
<td>0.05%</td>
</tr>
<tr>
<td>Germination (Min)</td>
<td>85.00%</td>
</tr>
</tbody>
</table>
Natural Certification: Track 2

• Natural Track Certification
  – Traditionally reserved for wildland collected, \textit{restoration} species
  – Begins with \textbf{SOURCE IDENTIFIED} designation

• Source Identification (ID):
  – \textit{Class of propagating materials collected from natural stands, seed production areas, seed fields, or orchards where no selection or testing of the parent population has been conducted.}
The Need for Native Plant Genetic Source Identification...

- “For some species...wildland collection can supply a significant seed volume for direct plantings.
- For most species, however, accessions consisting of limited quantities of seed obtained from defined wildland stands must be increased in fields or nurseries.
- Unfortunately, accurate documentation of collection site and/or cultivated production has often been unavailable to those seeking site-appropriate native plant materials.”

- The natural track certification pathway fills that industry void.
- **Source Identified** seed material allow for the industry to begin using the right seed, at the right place, at the right time.
  - Local adaptability is the basis
  - Emphasizing ecological site characteristics
  - Providing the buyer with beneficial information to allow for elevated chances of success
  - Limitation of generations to preserve $G_0$ plant characteristics.

- Selective breeding of desired plant characteristics through Selected/Tested class distinction for future generations.

The AOSCA Native Plant Connection, 2003
Source Identification: Benefits

- Source ID is an optional quality assurance measure that can be applied to wildland seed.
Source Identification: Purpose

- **Source Identified Assurance:**
  - Quality
    - Inspections guarantee stand integrity and seed presence/maturity.
  - Purity
    - Lab analysis verifies cleanliness and viability of seed for buyer security.
  - Identity
    - ID is conducted by a non-bias third party to ensure species exactness.
  - Traceability
    - Tags are issued based upon clean lot yields. Each lot is associated with a certification number linking back to collection date and inspection data.
  - Ecology
    - Data is collected during each inspection related to the ecological attributes of the site that will assist the buyer in selecting seed specific to each, unique, job type.
Source Identification - How

- **NDA’s Guide to a Successful Source ID:**
  1. **File an application*** with NDA prior to collection;
  2. Ensure that **collection crew is present** at time of inspection (not necessary, but recommended);
  3. **Communication is key** – inform us regarding any site changes and provide a thorough line of documentation for each collection site;
  4. Provide **precise information** regarding site coordinates;
  5. **Collect a voucher** for record keeping;
  6. Update NDA on **quantities collected** to order the appropriate amount of tags.
Natural Track: Class Progression

- **Source Identified (PVG)**
  - Must have had **no selection** or testing of their parent population.

- **Selected (PVG)**
  - The progeny of phenotypically selected plants of untested parentage that indicate, **but do not prove**, genetic superiority or distinctive traits.

- **Tested (PVG)**
  - The progeny of plants whose parentage has been tested and has **proven genetic superiority** or possesses distinctive traits for which the heritability is stable, but for which a variety has not been recognized.

- **Cultivar (For admittance within the Cultivated/Manipulated Track)**
  - A plant variety that has been produced via selective breeding techniques and consistently exhibits desired characteristics.
    - Ie. Eagle Western Yarrow / Magnar Basin Wildrye

PVG: Pre-Varietal Germplasm

agri.nv.gov
Natural Track: Class Distinction

Source Identified ($g_0$)  Selected  Tested
## Natural Track Tagging Features

### Source Identified Seed

<table>
<thead>
<tr>
<th>Species Name</th>
<th>Sporobolus heterolepis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common Name</td>
<td>Prairie Dropseed</td>
</tr>
<tr>
<td>Germplasm ID,Gen.</td>
<td>G3/5</td>
</tr>
<tr>
<td>G3 State, County, Elev.</td>
<td>WI, Dane, 800 ft.</td>
</tr>
<tr>
<td>G0 State, Region, Elev.</td>
<td>WI, Southwest, 750 ft.</td>
</tr>
<tr>
<td>G0 Indigenous?</td>
<td>Yes</td>
</tr>
<tr>
<td>Natural-Track?</td>
<td>Yes</td>
</tr>
<tr>
<td>Lot:</td>
<td>2999-SPOHET-3-SE: 03346</td>
</tr>
</tbody>
</table>

### Selected Class Seed

<table>
<thead>
<tr>
<th>Species Name</th>
<th>Krascheninnikovia lanata</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common Name</td>
<td>Winterfat</td>
</tr>
<tr>
<td>Germplasm ID,Gen.</td>
<td>OR, Malheur, 2300 ft.</td>
</tr>
<tr>
<td>G2 State, County, Elev.</td>
<td>ID, Bingham, 4100 ft.</td>
</tr>
<tr>
<td>G0 Indigenous?</td>
<td>No</td>
</tr>
<tr>
<td>Natural-Track?</td>
<td>No</td>
</tr>
<tr>
<td>Cert. #:</td>
<td>00497</td>
</tr>
<tr>
<td>Lot #:</td>
<td>KL203</td>
</tr>
</tbody>
</table>

### Tested Class Seed

<table>
<thead>
<tr>
<th>Species Name</th>
<th>Dalea candida</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common Name</td>
<td>White Prairie Clover</td>
</tr>
<tr>
<td>Germplasm ID,Gen.</td>
<td>Antelope, G2/5</td>
</tr>
<tr>
<td>G2 State, County, Elev.</td>
<td>MT, Carbon, 3350 ft.</td>
</tr>
<tr>
<td>G0 State, County, Elev.</td>
<td>ND, Stark, 2400 ft.</td>
</tr>
<tr>
<td>G0 Indigenous?</td>
<td>Yes</td>
</tr>
<tr>
<td>Natural-Track?</td>
<td>Yes</td>
</tr>
<tr>
<td>Lot #:</td>
<td>SFD-02-FLD20-1</td>
</tr>
</tbody>
</table>

### Certified Class Seed

<table>
<thead>
<tr>
<th>KIND:</th>
<th>Mountain Big Sagebrush</th>
</tr>
</thead>
<tbody>
<tr>
<td>VARIETY:</td>
<td>Hobble Creek, “Natural-track”</td>
</tr>
<tr>
<td>CERT. #:</td>
<td>WC-1852</td>
</tr>
<tr>
<td>LCT #:</td>
<td>ArTrVaHC-02001</td>
</tr>
<tr>
<td>Varietal Descriptors:</td>
<td>Source (2)</td>
</tr>
<tr>
<td>-----------------------</td>
<td>------------</td>
</tr>
<tr>
<td>Plant Description (1)</td>
<td>2</td>
</tr>
<tr>
<td>Conservation Uses (3)</td>
<td>3</td>
</tr>
<tr>
<td>Area of Adaptation (4)</td>
<td>4</td>
</tr>
<tr>
<td>Establishment (5)</td>
<td>5</td>
</tr>
<tr>
<td>Management (6)</td>
<td>6</td>
</tr>
<tr>
<td>Ecological Considerations (7)</td>
<td>7</td>
</tr>
<tr>
<td>Seed Production (8)</td>
<td>8</td>
</tr>
<tr>
<td>Availability (9)</td>
<td>9</td>
</tr>
</tbody>
</table>
• Cultivated Variety, “Cultivar”:
  – “A plant variety that has been produced via selective breeding techniques and consistently exhibits desired characteristics”
    • The breeder of a plant species may formally declare cultivar status through USDA – Plant Varietal Protection (PVP) Act
      – Essentially filing for a patent on a unique plant design
• Achieving Breeder Seed Designation:
  – After the breeder has identified unique, stable and pure plant characteristics they may submit an application for review to a Plant Variety Review Board, under AOSCA.
Finding Common Ground...Two Paradigms

Pre Varietal Germplasm

- Harvestability
- Distinct/Uniform
- Viability/Vigor
- Stability/Purity
- Yield Increase
- Ecotypic Variation
- Unmanipulated
- Increases possibility of success

Cultivated

Ecologically Pure

Local Adaptation

Natural

Distinct/Uniform

Stability/Purity

Yield Increase

Ecotypic Variation

Unmanipulated

Increases possibility of success

Nevada Department of Agriculture

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Nevada’s Industry – The Need for Seed

• Linking Pre-Varietal Germplasm to Controlled Crop Production.
Questions?

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