

# Certification of Wildland Seed

## Source Identification & Beyond

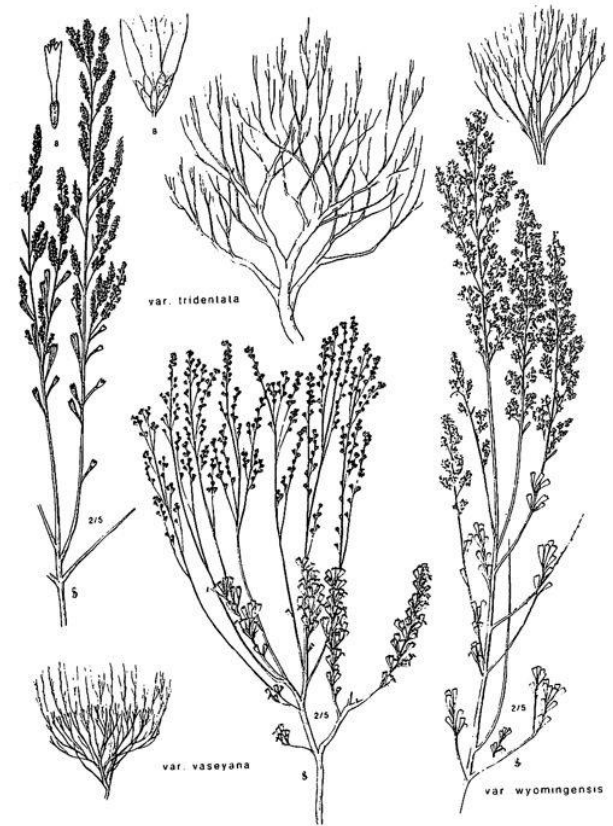


Nevada Department  
of Agriculture

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Seed Program Manager

March 14, 2019



# 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**

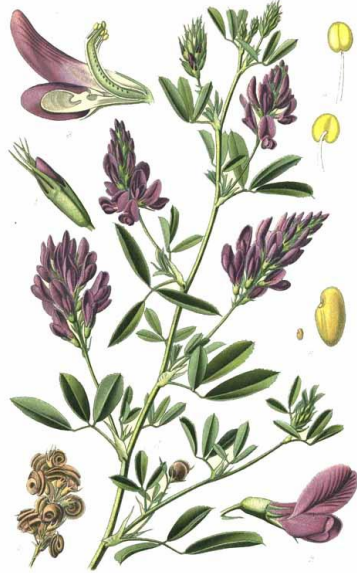
- Source ID
- Selected
- Tested
- Cultivar\*

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*\*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.*

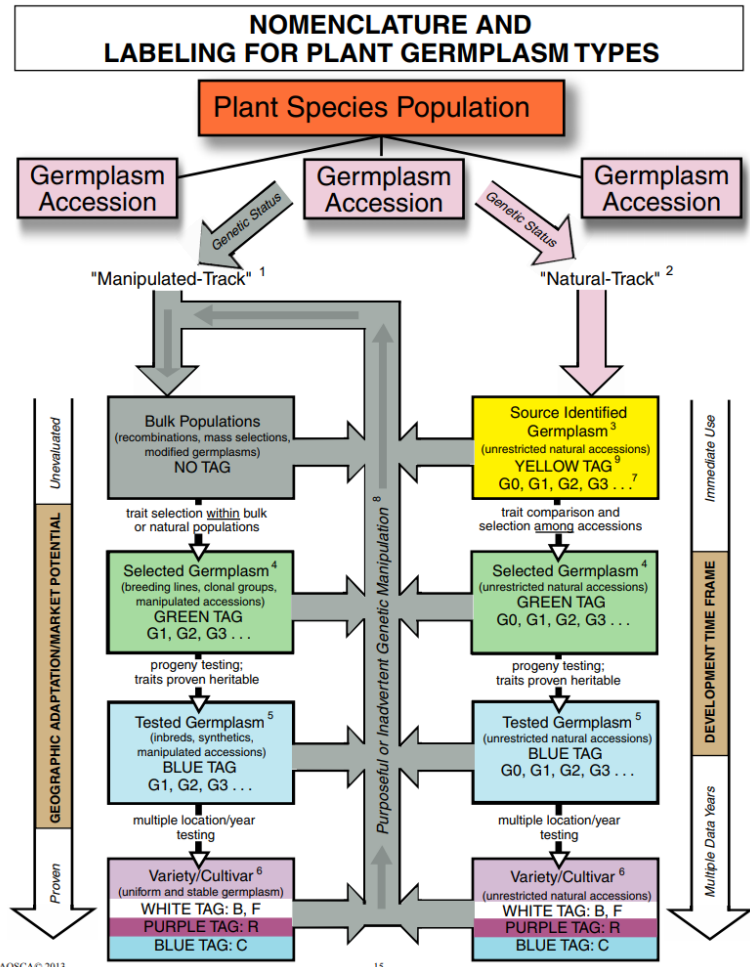
# Track Distinction and Relations



Pl. 75. *Lucerne cultivée*. *Medicago sativa* L.



Pl. 200. *Promène commun*. *Triticum vulgare* Vill.



AOSCA © 2013

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# 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



# Certified Seed Standards: AOSCA

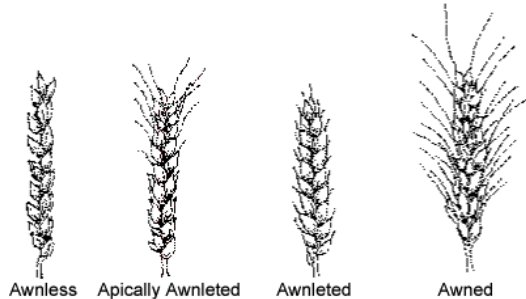
- **The Association of Official Seed Certifying Agencies**
  - “Yellow Book”
    - Develops standards pursuant to each “crop” type and designation.
      - Standards relate to overall crop quality:
        - » Off-type presence
        - » Weed presence
        - » Pathogenic infection
        - » Lot purity/viability



# Field/Lot Standards: Crop Example

## Small grain standards pursuant to class designation

NAC 587.286	Maximum Permitted in Each Class of Small Grain: Field (Ratio Of Plants)		
Factor	Foundation	Registered	Certified
Other Varieties	None	1:5,000	1:2,000
Other Small Grains	None	1:10,000	1:3,000
Wild Oats	None	1:10,000	1:3,000
Smut	1:10,000	1:10,000	1:1,000



NAC 587.288	Standards for Classes of Small Grains: Lot		
Factor	Foundation	Registered	Certified
Pure Seed (Min)	98.00%	98.00%	98.00%
Other Crop (Max)	None	0.03%	0.05%
Other Small Grain (Max)	None	2/lb.	2/lb.
Weed Seed (Max)	0.01%	0.01%	0.03%
Noxious Seed (Max)	None	None	None
Objectionable Seed (Max)	None	None	None
Inert Matter (Max)	2.00%	2.00%	2.00%
Ergot (Max)	0.05%	0.05%	0.05%
Germination (Min)	85.00%	85.00%	85.00%





# Natural Certification: Track 2

- **Natural Track Certification**

- Traditionally reserved for wildland collected, **restoration** species

- Begins with SOURCE IDENTIFIED designation

- Source Identification (ID):

- *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.”**

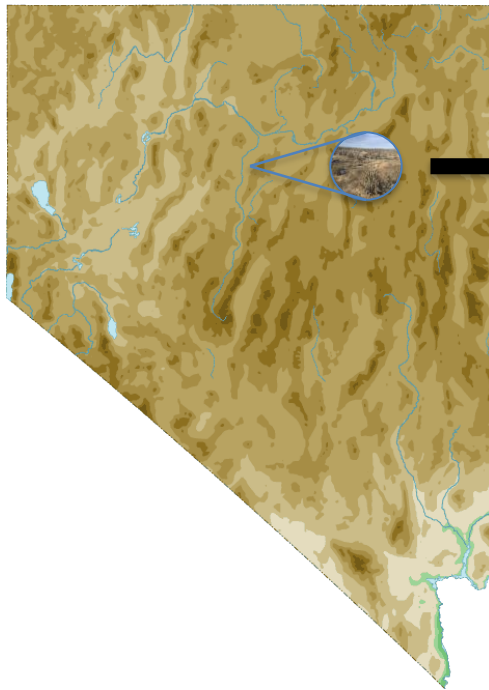


- The natural track certification pathway fills that industry void.
- **Source Identified** seed material allow for the industry to begin using the right seed, at the right place, at the right time.
  - Local adaptability is the basis
  - Emphasizing ecological site characteristics
  - Providing the 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*



# Natural Track: Class Distinction

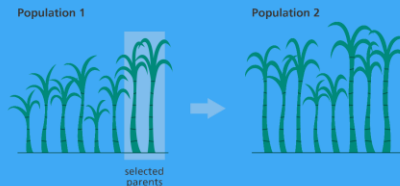
Source Identified ( $g_0$ )



Selected



Tested



# Natural Track Tagging Features

SOURCE IDENTIFIED SEED		
Agency logo here	Species Name	<i>Sporobolus heterolepis</i>
	Common Name	Prairie Dropseed
	Germplasm ID, Gen.	G3/5
	G3 State, County, Elev.	WI, Dane, 800 ft.
	G0 State, Region, Elev.	WI, Southwest, 790 ft.
	G0 Indigenous?	Yes
	Natural-Track?	Yes
	Lot:	2999-SPOHET-3-SE; 03346
MEMBER OF ASSOCIATION OF OFFICIAL SEED CERTIFYING AGENCIES		

SELECTED CLASS SEED		
Agency logo here	Species Name	<i>Krascheninnikovia lanata</i>
	Common Name	Winterfat
	Germplasm ID, Gen.	Northern Cold Desert, G2/3
	G2 State, County, Elev.	OR, Malheur, 2300 ft.
	G0 State, County, Elev.	ID, Bingham, 4100 ft.
	G0 Indigenous?	No
	Natural-Track?	No
	Cert. #:	00497
Lot #:	KL203	
MEMBER OF ASSOCIATION OF OFFICIAL SEED CERTIFYING AGENCIES		



TESTED CLASS SEED		
Agency logo here	Species Name	<i>Dalea candida</i>
	Common Name	White Prairie Clover
	Germplasm ID, Gen.	Antelope, G2/5
	G2 State, County, Elev.	MT, Carbon, 3350 ft.
	G0 State, County, Elev.	ND, Stark, 2400 ft.
	G0 Indigenous? Yes	Cert. #: 026962
	Natural-Track? Yes	Lot #: SFD-02-FLD20-1
	MEMBER OF ASSOCIATION OF OFFICIAL SEED CERTIFYING AGENCIES	

CERTIFIED CLASS SEED		
Agency logo here	KIND:	Mountain Big Sagebrush
	VARIETY:	Hobble Creek, "Natural-track"
	CERT. #:	WC-1852
	LOT #:	ArTrVaHC-02001
MEMBER OF ASSOCIATION OF OFFICIAL SEED CERTIFYING AGENCIES		

The AOSCA Native Plant Connection, 2003



# Cultivar (Variety): Characteristics

## Varietal Descriptors:

### Plant Description (1)

### Source (2)

### Conservation Uses (3)

### Area of Adaptation (4)



### Establishment (5)

### Management (6)

### Ecological Considerations (7)

### Seed Production (8)

### Availability (9)

 <p>United States Department of Agriculture Natural Resources Conservation Service Plant Materials Program</p> <p>A Conservation Plant Release by USDA NRCS Aberdeen Plant Materials Center, Aberdeen, Idaho</p>	<p><b>'Magnar' Basin Wildrye</b> <i>Leymus cinereus</i> (Scribn. &amp; Merr.) A. Löve</p>	<p>summer (July to mid September) seedlings are not recommended. Seedling vigor is fair, and stands may take 2 to 5 years to fully establish.</p>	<p>Seed production of Magnar has been very successful under cultivated conditions. Row spacing of 36 inches (3.5 pounds PLS per acre) to 48 inches (3.0 pounds PLS per acre) is recommended. Between row cultivation is recommended for maintaining row culture.</p>
 <p>'Magnar' basin wildrye (<i>Leymus cinereus</i>)</p>	<p><b>Conservation Uses</b> 3 Magnar basin wildrye can be used as a component of a seed mix for rangeland, erosion control, forage and cover seedlings in 12 to 20 inch rainfall zones, mine spoil reclamation, and critical area stabilization. Because of its stature and ability to remain standing during dormancy it can be used as herbaceous wind barriers or crosswind trap strips to control soil erosion on cropland.</p> <p>Basin wildrye is palatable to all classes of livestock and wildlife; however, it is generally not recommended for spring or summer forage production, because it has an elevated growing point and is easily damaged by overgrazing. It is ideal for providing wind protection in winter calving pastures.</p> <p>Because basin wildrye is a tall upright bunchgrass, it is considered excellent cover habitat for small animals and birds, excellent nesting cover for upland birds, and provides excellent standing winter feed and cover for big game animals.</p>	<p>Stands may require weed control measures during establishment. Bromoxynil may be applied at the 3-4-leaf stage of grass for early suppression of young broadleaf weeds. Application of 2,4-D should not be made until plants have reached the 4-6-leaf stage. Mowing the stand when weeds are beginning to bloom will reduce weed seed development. Grasshoppers and other insects may also damage new stands. Use of pesticides may be required. All herbicides and pesticides should be applied according to the label.</p> <p><b>Management</b> 6 Basin wildrye establishes slowly and new seedlings should not be grazed or hayed until at least late summer or fall of the second growing season. Basin wildrye makes its initial growth in early spring and matures seed by late summer. It reproduces primarily by seed and tillers.</p> <p>Basin wildrye is palatable to all classes of livestock and wildlife. It holds approximately twice the nutrient value (7-8% protein) of wheatgrasses (3-4% protein) at maturity and can withstand heavy grazing and trampling in its dormant state. New stands should not be grazed until plants are at least 10 inches tall. Overgrazing, especially in spring, easily damages basin wildrye, and stubble of at least 10 inches should remain following grazing.</p>	<p>Seed fields are productive for five to seven years. Average production of 150 to 200 pounds per acre can be expected under dryland conditions in 14 inch plus rainfall areas. Average production of 300 to 400 pounds per acre can be expected under irrigated conditions. Direct combining best completes harvesting with the platform set high to get most of the seed and as little vegetative growth as possible. The seed heads have moderate rates of shatter and require close scrutiny of maturing stands. Seed is generally harvested in mid-August to September. Seed must be dried immediately after combining (12 percent bins/15 percent sacks moisture content).</p> <p><b>Availability</b> 9 <i>For conservation use:</i> Seed is widely available from commercial seed vendors.</p> <p><i>For seed or plant increase:</i> Breeder and Foundation seed is maintained by the Aberdeen PMC. Foundation seed is available through the University of Idaho Foundation Seed Program and Utah Crop Improvement Association. Certification of seed shall be limited to not more than two generations from Foundation seed (Registered and Certified).</p>
<p><b>Description</b> 1 Magnar is a hardy, robust, long-lived native perennial bunch grass. Culms are numerous, erect and stout, ranging from 3 to 8 feet tall depending on the site. Short, thick rhizomes are present in some plants. Blades are generally blue-green in color, firm, flat, cauline, up to 1 inch wide, and up to 30 inches in length. Large, erect seed heads range from 4 to 12 inches in length.</p>	<p><b>Area of Adaptation and Use</b> 4 Magnar is adapted to the western Great Plains and Intermountain regions of the United States and Canada at elevations from 1000 to 9000 feet. It grows best in areas with annual precipitation of 8 to above 16 inches.</p> <p>Magnar has a broad soil texture adaptation. It is not recommended for use on shallow soils or coarse textured, deep sands. It has some tolerance to saline and sodic soil conditions and will withstand a relatively high water table but will not tolerate extended periods of inundation.</p>	<p>Established stands can be grazed in late spring or fall (leave about 10 inches of stubble to protect plant health). Following grazing, little re-growth can be expected, even when the stand is irrigated. Basin wildrye is a low maintenance plant requiring little additional treatment or care. However, it may benefit from low levels of fertilization. Apply nitrogen at 30 pounds per acre on dryland plantings and 60 to 80 pounds per acre on irrigated plantings for optimum production.</p>	<p><i>For more information, contact:</i> Aberdeen Plant Materials Center PO Box 296, Aberdeen, Idaho 83210 Ph. 208-397-4133 Fax 208-397-3104 <a href="http://plant-materials.nrcs.usda.gov/idpmc/">http://plant-materials.nrcs.usda.gov/idpmc/</a></p>
<p><b>Source</b> 2 Parent material of Magnar was originally received from the University of Saskatchewan, Saskatoon, Saskatchewan, Canada in 1939. Detailed collection site information is not available.</p>	<p><b>Establishment and Management for Conservation Plantings</b> 5 This species should be drill at a depth of 1/4 to 3/8 inch on medium to fine textured soils and 1 inch or less on coarse textured soils. Single species seeding rate recommended for basin wildrye is 8 pounds Pure Live Seed (PLS) per acre. If used as a component of a mix, adjust to percent of mix desired. For rangeland mixtures, approximately 10 to 20 percent of mix or 1 to 2 pounds PLS should be considered. For mined lands and other harsh critical areas, the seeding rate should be doubled. When seeding is for a vegetative windbreak, vegetative terrace, or wildlife cover, it is recommended that 3.0 to 3.5 pounds PLS/ac be seeded in 36 to 48 inch rows.</p>	<p>No detrimental disease symptoms or insect problems have been observed in plantings of Magnar. Ergot has been occasionally observed on basin wildrye and it is susceptible to leaf and stem rust in wetter climatic areas.</p>	<p><b>Citation</b> Release Brochure for 'Magnar' Basin Wildrye (<i>Leymus cinereus</i>). USDA-Natural Resources Conservation Service, Aberdeen Plant Materials Center, Aberdeen, Idaho 83210. Published December 2012.</p>
<p>Magnar was first selected as having potential use at the Pullman, Washington PMC and was further evaluated at the Aberdeen PMC by selection of vigorous types during several generations. It was also recognized for being consistently superior to many other accessions in the production of viable seed.</p>	<p>The best seeding results are obtained from seeding in very early spring on heavy to medium textured soils and in late fall on medium to light textured soils. Summer and late</p>	<p><b>Ecological Considerations</b> 7 Basin wildrye is native to the Intermountain West and has no known negative impacts on wild or domestic animals. Magnar is not considered a weedy or invasive species but can spread to adjoining vegetative communities under ideal environmental conditions.</p>	<p>For additional information about this and other plants, please contact your local USDA Service Center, NRCS field office, or Conservation District &lt;<a href="http://www.nrcs.usda.gov/">http://www.nrcs.usda.gov/</a>&gt;, and visit the PLANTS Web site &lt;<a href="http://plants.usda.gov/">http://plants.usda.gov/</a>&gt; or the Plant Materials Program Web site &lt;<a href="http://www.plant-materials.nrcs.usda.gov/">http://www.plant-materials.nrcs.usda.gov/</a>&gt;</p>
		<p><b>Seed and Plant Production</b> 8</p>	

# How to Develop a Cultivated Variety

- **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

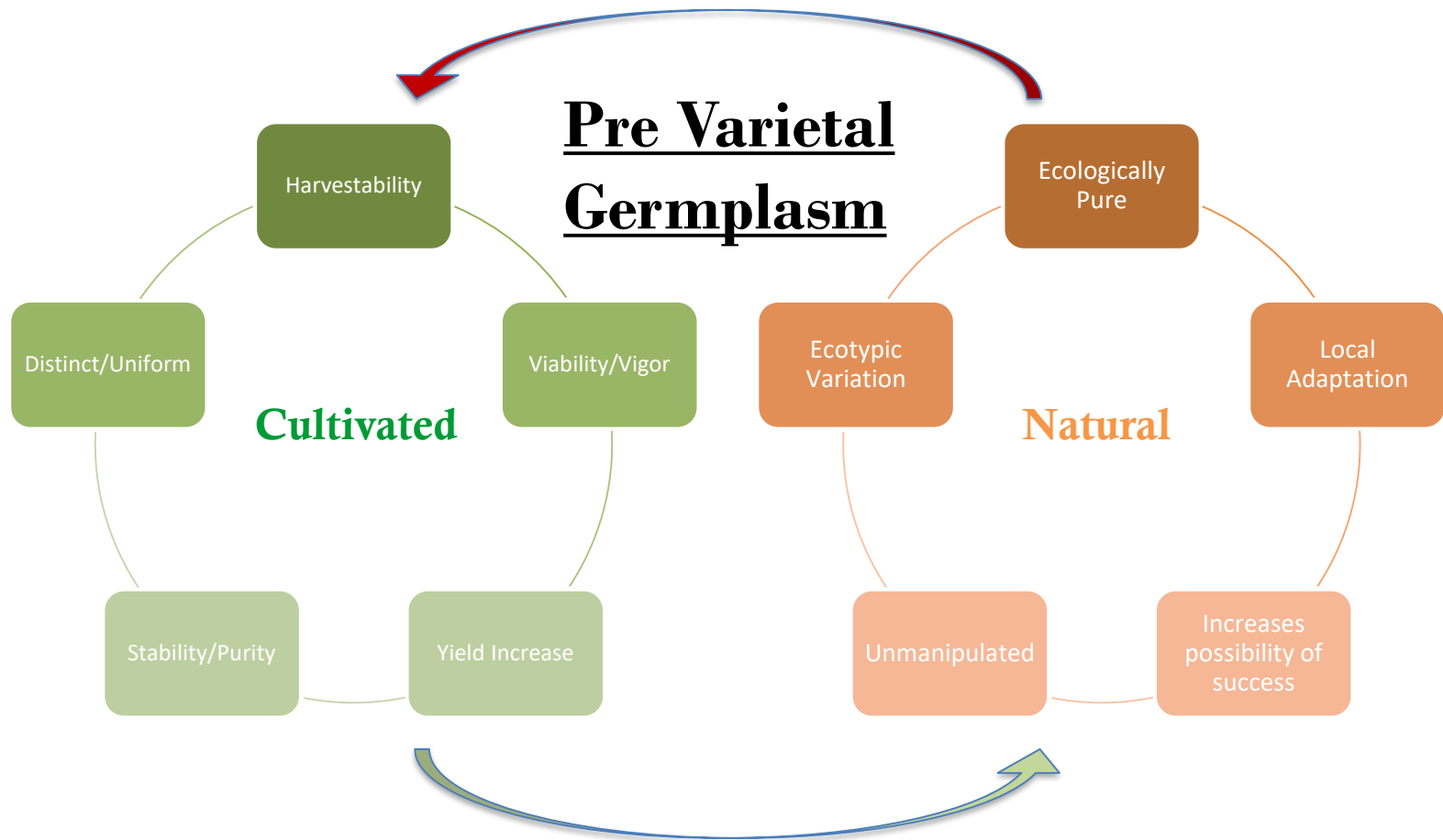
- Essentially filing for a patent on a unique plant design

- 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.

2. Seasonal Growth Habit:	<u>Winter</u>	16. Awn Type:	<u>Apically awnletted</u>
3. Coleoptile Color:	<u>White</u>	17. Awn Color:	<u>Tan</u>
4. Juvenile Growth Habit:	<u>Semi-erect</u>	18. Glume Color:	<u>Tan</u>
5. Leaf Color at Boot:	<u>Green</u>	19. Glume Length:	<u>Short</u>
6. Flag Leaf at Boot:	<u>Erect, Twisted, Waxy Bloom</u>	20. Shoulder Shape:	<u>Rounded</u>
7. Auricle Color:	<u>White</u>	21. Shoulder Width:	<u>Medium</u>
8. Days to 50% Heading:	<u>116 after Jan 1 (early)</u>	22. Beak Shape:	<u>Obtuse</u>
9. Anther Color:	<u>Yellow</u>	23. Beak Length (S.M.L.VL):	<u>Short</u>
10. Anthocyanin:	<u>White</u>	24. Glume Pubescence:	<u>Present</u>
11. Plant Height (cm):	<u>92.5</u>	25. Seed Color:	<u>Red</u>
12. Internodes:	<u>Hollow</u>	26. Seed Shape:	<u>Ovate</u>
13. Spike Shape:	<u>Tapering</u>	27. Cheeks:	<u>Rounded</u>
14. Spike Density:	<u>Mid-dense</u>	28. Brush Size (S,M,L.):	<u>Medium</u>
15. Spike Curvature:	<u>Nodding</u>	29. Avg 1,000 Kernel Wt (grams):	<u>32</u>

# Finding Common Ground...Two Paradigms



# Nevada's Industry – The Need for Seed

- Linking Pre-Varietal Germplasm to Controlled Crop Production.





# Questions?



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