

AC21 March 5 Plenary Session Questions



1. **What steps do you take to safeguard the purity of your crop/seed production?**
2. **What policies as a company/organization do you have in place to ensure the quality of products derived from your seed?**
3. **What policies do you mandate/encourage farmers to use to limit pollen movement off of their fields?**

Charles Brown
Brownseed Genetics, LLC
President



Dedicated Non-GMO Seed Plant
30,000 unit capacity

100% non-GMO inbred line
development

Third Generation.

Family owned and operated.
Began in 1911.

Independent corn breeding program. Focus early maturity, value-added.

CBSeed™ retail brand focused on Northern US corn belt – GMO and non-GMO seed.



Brownseed Genetics Seed Purity Program – Operating Procedures

1. Purity Plus™ Production Standard for high probability of success in non-GMO seed production

**Isolation requirements
Phenotype requirements
Seed quality requirements
Seed purity requirements**

2. Require 3rd Party validation at every step.

**AOSCA certification
Seed tag
MCIA initial coordinator**



[Certifier Login >](#)

Purity Plus™ The Gold Standard for Genetic Purity



FOOD COMPANIES

SEED COMPANIES/BREEDERS

GRAIN BUYERS

CONSUMERS

FARMERS

Purity Plus is a new standard created to ensure very low, if any, adventitious presence of genetically modified organism (GMO) proteins in foundation and hybrid seed corn.

Seed corn labeled with the Purity Plus logo has been certified to have no detectable presence of GMOs. When this seed is grown according to an approved production and testing protocol, it will yield grain that is absent any GMO traits.

The Purity Plus standards have been verified by AOSCA (Association of Official Seed Certification Agencies), and each state's seed certification agency where Purity Plus products are grown.

*When non-GMO seed is essential,
Purity Plus is the answer!*



"We have a lot of customers requesting that our product is non-GMO across the board, from our grains to our colors to our nutraceuticals. We see that as a significant trend within the industry, and Purity Plus allows us a major point of differentiation. We want to be on the cutting edge, and we view Brownseed Genetics as taking us to that spot."
SUNTAVA • Bill Petrich, CEO



Marketing
Support

2012
Launch

Purity Plus™
SEED CORN PRODUCTION STANDARDS

The Gold Standard in non-GMO Crop Production™

Purity Plus™ has developed production and testing standards to validate very low, if any, Adventitious Presence of Genetically Modified Organisms (GMO) in organic and conventional corn production.

**Developed by Brownseed Genetics LLC and
BioDiagnostics Inc
in cooperation with the
Association of Official Seed Certifying Agencies (AOSCA)**

PURITY PLUS™ INBRED SEED

ISOLATION STANDARDS

1. Minimum isolation from corn: 1320 feet*
2. Minimum isolation from biotech-trait corn: 2640 feet*
3. The previous crop on a parent seed increase field should be any crop other than corn

*Isolation can be modified by use of border rows – 1 row=30', maximum 20 border rows.

PHENOTYPIC STANDARDS

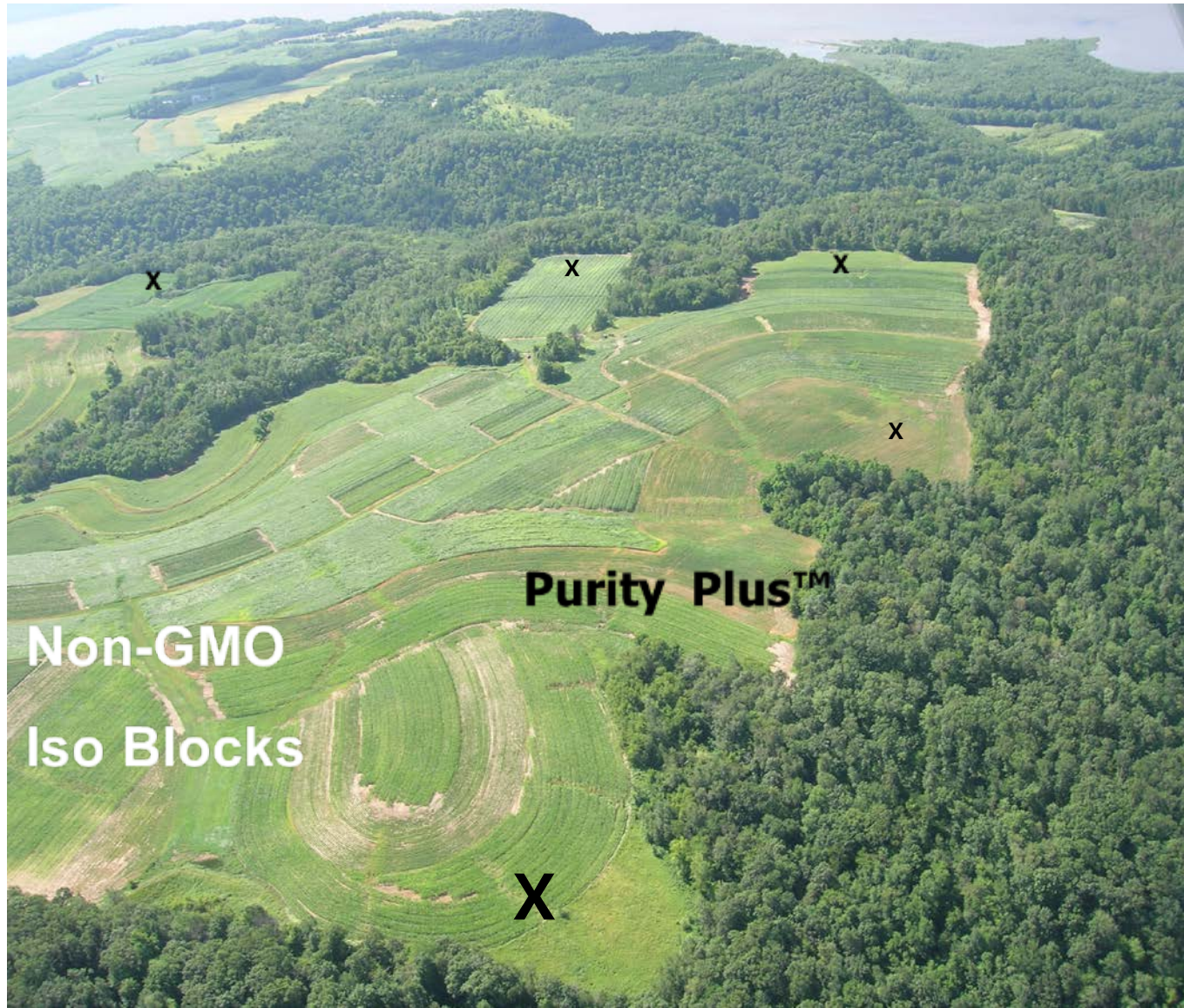
1. An inbred seed increase field shall have no more than 0.1% (1 per 1000) off-type plants
2. Conditioned inbred seed shall have no more than 0.2% (2 per 1000) of off-color or off-textured kernels

SEED QUALITY STANDARDS

- | | |
|------------------------------|--------|
| 1. Pure Seed (minimum) | 99.50% |
| 2. Inert Matter (maximum) | 0.50% |
| 3. Other crop seed (maximum) | 0.00% |
| 4. Weed seed (maximum) | 0.00% |
| 5. Standard Germ | 95.00% |
| 6. Cold Germ | 85.00% |

GENETIC PURITY STANDARDS

1. Two and three loci off types: Maximum of 0.5% (1 per 200 plants)
2. Variants: Maximum of 0.5% (1 per 200 plants)
3. Adventitious presence: Maximum of 0.03% at 95% Confidence (**None Found in 10,000k**)



Change from
Previous practice
To Purity Plus™

Purity Plus™ Testing Process			
Step	Test		
1-Program Entry Evaluation	Isozyme Pre-evaluation		
2-Inbred Purification	AP Test Nursery Plants		
2-Inbred Purification	Breeders Seed Purification		
3-Breeders Seed Increase	Bulk AP		
3-Breeders Seed Increase	Breeders Seed Purification		
3-Breeders Seed Increase	SNP Marker Genotype		
4-Parent Seed Increase	Inbred Purity		
4-Parent Seed Increase	AP Test		
4-Parent Seed Increase	Warm Test		
4-Parent Seed Increase	Cold Test		
4-Parent Seed Increase	Purity Analysis		
5-Commercial Inbred Seed Production	Inbred Purity		
5-Commercial Inbred Seed Production	AP Test		
5-Commercial Inbred Seed Production	Warm Test		
5-Commercial Inbred Seed Production	Cold Test		
5-Commercial Inbred Seed Production	Super Cold Test		
5-Commercial Inbred Seed Production	Purity Analysis		
6-Commercial Hybrid Seed Production	Hybrid Purity		
6-Commercial Hybrid Seed Production	AP Test		
6-Commercial Hybrid Seed Production	Warm Test		
6-Commercial Hybrid Seed Production	Cold Test		
6-Commercial Hybrid Seed Production	Super Cold Test		
6-Commercial Hybrid Seed Production	Purity Analysis		

**From single ear to
Commercial hybrid seed
Six generations**

Policies to ensure quality products



- **Company Policy next 2 years**

Purity Plus™ Standards

Organic seed market

Foreign markets

US non-GMO market

Policies to encourage farmers to limit pollen movement off-field



- **Company Policy next 2 years**

Market Approach

1. **Pull-through with market incentives.**
Food Companies want non-GMO validated seed.
2. **ROI factor. With investment in Purity Plus™ Foundation seed, Hybrid Seed Co. will want to maintain purity and value. Same for on-farm.**

THANK YOU

Questions?