Seed Health: Current Status and Future Directions

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APHIS Involvement in Seed Trade

• Overview of Global Seed Trade
• Seed Exports
  • National Seed Health System
• Seed Imports
  • Current System
  • National Seed Health Accreditation Pilot Program
• Seed Health Regulatory Framework
Forty Years of Seed Trade
Traditional Trade Model
1. Breeding parental lines: Europe State 1
2. Production of basic seeds: Europe State 2
3. Treatment and manufacture of basic seeds: Europe state 1
4. Production of hybrid seeds: China
5. Treatment and manufacture of commercial seeds: Europe state 1
6. Commercial packaging: USA
7. Final market: Mexico

*Adapted from a presentation by Ric Dunkle, PPQ Seed Summit, 2014
Challenges of Seed Trade

• Seed potential pathway for pathogens
• Visual inspection not effective at finding pathogens
• Seed moves in complex global patterns
• Historic movement without phytosanitary barriers
Seed Trade Trends

Seed Testing
Mother Plant Testing
Seed Pathway Concerns
Accreditation and Certification
Exporting Seed

• 73,069 phytos issued in 2015
  – Canada, Mexico, and China
• 16,179 re-export phyto
  – Mexico, Canada, Netherlands
National Seed Health System (NSHS)

• Authorized under 7 CFR 353.8 in July 2001
• Accreditation of non-governmental entities
• Supports export certification activities
NSHS Accreditations

- Seed Health Testing
- Seed Sampling for Seed Health Testing
- Visual Inspection of Seed for Phytosanitary Certificate
- Phytosanitary Field Inspection
Accreditations under NSHS

• Companies apply and submit quality manual
• Companies are audited prior to being accepted into the program
• Accreditation lasts for 3 years
Currently Accredited

- Agri Seed Testing
- California Seed and Plant Lab
- Dow/DuPont Pioneer
- Eurofins BioDiagnostics
- Heinz Seed
- HM Clause
- Idaho Crop Improvement
- Illinois Crop Improvement
- Indiana Crop Improvement
- Iowa Crop Improvement
- Iowa State University Seed Testing Lab
- Monsanto/Seminis
- NuSeed
- Sakata Seeds America
- SGS
- Smith Seed Services
- Syngenta
- Summit Plant Labs
- Sunburst Plant Disease Clinic
- US Agriseeds
More Information?

- [http://www.seedhealth.org/](http://www.seedhealth.org/)
Seed Imports into the U.S.

• Two major regulations:
  • Federal Seed Act
  • 7CFR319.37
Federal Seed Act

Contaminants

Purity

Labeling

Federal Seed Act
Q37

- Allows entry unless risk is demonstrated
- Regulates propagative material
- Enter with a phytosanitary certificate
Strengths of Current System

• Movement is easy
• No infrastructure requirements for seed testing
Weaknesses of APHIS Seed Health

• Risk assessment of dramatically increased seed trade lacking
• Porous system
• Reactionary
Seed As A Pathway
Cucumber Green Mottle Mosaic Virus

• Highly stable virus that persists in the environment
• Easily transmitted
• Results in high yield loss or unmarketable product
• Found in Sutter and Yolo Counties California (2013)

Source Biosecurity Australia
What is NSHAPP?

• National Seed Health Accreditation Pilot Program (NSHAPP)
• Alternative to Rulemaking approach to mitigating risk of incoming seed
• Funded by Farm Bill for FYs 15 & 16
• Iowa State partner with APHIS
What is NSHAPP?

- Coordinated effort between the National Seed Health System and APHIS
- Testing program for imported seed
- Prevent introduction of pathogens into the US
- Voluntary
- Initial target – CGMMV in cucumbers, melons, watermelon
Roles and Responsibilities - Industry

- Test incoming cucurbit seed using the approved ELISA method
- Report all data to ISU monthly and positives immediately

Source: seedsavers.org
NSHAPP Summary

• Five enrolled companies
• Five positive lots (India and China)
• 2,437 lots tested
More Information?

- http://www.seedhealth.org/imported-seed-pilot-program-nshapp
APHIS Seed Health Framework
APHIS Seed Health Framework

APHIS, states, and Industry work together to build a seed health framework to provide global leadership on seed health
Science-based Framework

Diseases follow seed pathway?

Develop More Testing and Treatment Options

Test Methods Available?

Treatments Available?
Industry Risk Mitigation Practices

- Pest Management
- Post-harvest Processing
- Quality Management
APHIS Seed Health Framework

- Accreditation of Industry Practices
- Pre/Post Harvest Treatment
- Seed Testing
- Safer Seed Trade

Seed Health Regulatory Framework
APHIS Seed Health Framework

Gather information

Engage with stakeholders

Seed Health Regulatory Framework
APHIS Seed Health Framework

Safe Global Seed Trade | Risk of Seed Transmitted Diseases
Questions?