Pest Listing Projects in the Seed Industry

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Why pest listing?

- **Address Phytosanitary Barriers to Trade!**
  - Disruptive and costly--field inspections and lab tests
  - Promote science based national regulations
  - Elimination of irrelevant Phyto ADs--Technically Unjustified or not Scientifically sound
- **Provide information for Pest Risk Analyses**
  - Often Required by the Importing Country
  - Organizes Required Scientific Data and/or Research
  - Allows for better allocation of resources
- **Pest Listing by the Seed Industry**
  - Establishes the seed industry as a credible partner in pest management
  - Quick reference to see what is available in terms of risk mitigation (seed tests and seed treatments).

Two Industry Initiatives;

International Seed Federation

- **Establish meaningful, science based, relevant pest lists for vegetable crops to facilitate the harmonization of phytosanitary requirements.**
  - Based entirely on Phyto AD requests for vegetable crops
  - Reviewed by companies and peers
  - References are checked and verified
  - Information is standardized, transparent and seeks feedback
  - Represents 90% of all commercial vegetable sales volume
  - http://www.worldseed.org/isf/pest_lists_db.html

Two Industry Initiatives;
American Seed Trade Association

- **Provide scientific data and resources for Pest Risk Analyses required for establishing scientifically sound Phytosanitary requirements.**
  - Focuses on pests regulated by the NPPO's in the America's, primarily.
  - Since pests are regulated, the list is Pest-Based (Prioritized based on US Seed Industry needs)
  - Includes vegetable and agronomic crops
  - Pathway, seed testing and mitigation for each host/pest combination.
  - References are verified
  - Information is also standardized, transparent and seeks feedback
  - In the process of being harmonized with ISF
  - In the process of being converted to a Web-based application

ASTA Pest Listing Procedure

- Preliminary information on pest name, distribution, host range-primarily from CABI Database, Description of Plant Viruses, USDA GRIN Database.
  - Information on presence in the US
  - Information on presence in importing country
- Each crop listed as a host and with importance to US Seed Industry is listed in Seed Information Section
  - Determine role of seed (seed a pathway?)
  - Determine Seed Health Testing
  - Determine Seed Treatments and other Mitigations

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Example; Xanthomonas horotum pv. carotae (Xh carotae)

https://docs.google.com/spreadsheets/d/1stD2_50Y9mSqTwBU-hN79u7KfEE8N2FuQmMoq7BZq60/edit#gid=1856511529

Seed as a Pathway– ". . . is our primary concern.

…placement of pathogens in a category of seedborne vs. seed transmitted does not necessarily equate to a certain risk level. There is a range of risk for each category depending on the pathogen and export/import situation." –USDA APHIS Feedback to ISF, 2009

Seed as a Pathway Definitions	
Yes	Seed proven through controlled experiments or surveys of seed samples to be seedborne or seed transmitted.
Yes, experimentally	Seed shown to be infested with pathogen in laboratory experiments, but no data known or presented to confirm natural infection of seed
No, Pathway not proven	Seed may have been listed or inferred as a pathway for the pathogen, but no data known or presented to confirm pathway
No	No evidence that seed is a pathway through controlled experiments, seed sample surveys or practical knowledge of seed production. Or crop is not known to be a host of the pathogen.

Example; Alternaria porri (A porri)

https://docs.google.com/spreadsheets/d/1N03zhQC7RDKm-bFR7WHxzNFW5Y9m52kQ1PPDL8bJYn0/edit#gid=1428437769

Verification of References;

Each seed reference in CABI verified for data and accuracy of interpretation of data

- Often CABI (other) cites an author who has listed the pest as "seedborne" based on;
  - Similar viruses are known to be seed borne (nepoviruses; Lister and Murant, Neergaard)
  - The pest is seedborne in one host, therefore it is speculated that the pest is seedborne in all hosts.
- No, Pathway not proven!

- Author conducts seed experiments in the laboratory, often by artificial means of pest introduction. (SqMV in watermelon)
- No evidence presented that natural pest infections result in seed as a pathway. (nepoviruses)
- Yes, experimentally

Example: tobacco ring spot virus (TRSV)

https://docs.google.com/spreadsheets/d/1Jh8OAprOgt8DV6BCfsMz1xam8y2nz3jje6K2fu5XFWQ/edit#gid=2089645591

Pest Listing Data Summary

- 64 pests have been listed to date;
  - 11 bacteria
  - 19 fungi
  - 30 viruses
  - 4 nematodes or parasitic plants
- Primarily pests of vegetable, corn, soybean and alfalfa
  - 227 host/pest combinations
  - 69 “yes”—pathway proven (30%)
  - 16 “yes, experimentally” (7%)
  - Remaining 63% seed is not a pathway, not proven to be a pathway or the crop is not a host of the pest

Pest Listing Data Summary

34% are 'Not a Host'
43% are 'No, seed is not a pathway'
14% are 'Pathway not proven'
9% are 'Yes'

- Most of the 'Pathway not proven' are not known to be a significant concern to the seed industry. Information based on experimental evidence, limited observations, dated literature, etc.
- ~90% of Phyto AD requests are irrelevant.
  - (major vegetable crops)

Next Steps

- Continue harmonization with ISF efforts
- Corroborate information and data with US Regulatory officials
- Develop the web-based catalogue
- Prioritize the next round of pests to be listed

- Thank you.

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