Discussion: Research Needs to Support NPDRS

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Detection, Diagnosis & Survey Needs:

- Clear list of targets
- Standardized protocols that are rapid, accurate, reliable, easy to use, easy to interpret, cheap
- Collections of reference strain ‘materials’ that represent diversity
- User-friendly searchable/usable databases populated with multiple levels of information
  - A requirement for publishing?
- Real-time field-level surveillance and detection systems
- Identify/recognize non-native plant diseases/pathogens
- Surveys to identify threatening pathogens outside of US
- Need trained pathologists/taxomists/bioinformatics/etc

Recovery: Disease/Pathogen Eradication or Control

- Eradication
  - Would it be effective/reasonable?
- Cultural control
  - What are the side-effects?
  - Impacts of new cropping systems (biofuel corn on corn on corn)?
- Disease resistance
  - Sources of resistance (takes time to ID)
  - Stability and durability of the resistance (takes even more time)
  - Novel sources of resistance and the ability to deploy
- Chemical control
  - Effective, safe and approved chemicals available?
  - New chemistries in the works? ID of target sites?
- Integrated disease/pest management schemes
  - Requires significant knowledge of host/pathogen/pest and their interactions

What are the research questions underlying those needs?

Detection, Diagnosis & Survey Tool Needs:

- Surveillance & surveys:
  - Trap indicator plants (biosensors): plants recognize pathogens precisely; can we link that recognition system to an indicator (color change, etc)?
- Comparative biology:
  - Link databases of phenotype, biology, genotype to allow for big picture comparisons
  - Unbiased genome/proteome comparisons of multiple key strains of most important pathogens

Pathogen Biology

- How does pathogen cause disease?
- What is the host range?
- How does the pathogen spread?