NPDN
National Plant Diagnostic Network

USDA
United States Department of Agriculture
National Institute of Food and Agriculture

NPDN's Positive Impacts on Diagnostics and Extension Programming

Ray Hammerschmidt
NDPN Executive Director, Michigan State University

GPDN


National Repository
CERIS


NCPDN
North Central Plant Diagnostic Network

NEPDN
Northeast Plant Diagnostic Network


SPDN
Southern Plant Diagnostic Network


WPDN
Western Plant Diagnostic Network

Origins of the NPDN

In 2002, the U.S. Secretary of Agriculture established the Animal and Plant Disease and Pest Surveillance and Detection Network within CSREES

The mandate was to develop a network linking plant and animal disease diagnostic facilities across the country.

Currently funded by a cooperative agreement though the Food and Agriculture Defense Initiative/USDA-NIFA

- The initiative also supports NAHLN and EDEN

Before the NPDN

Information on new pests/diseases often scattered.

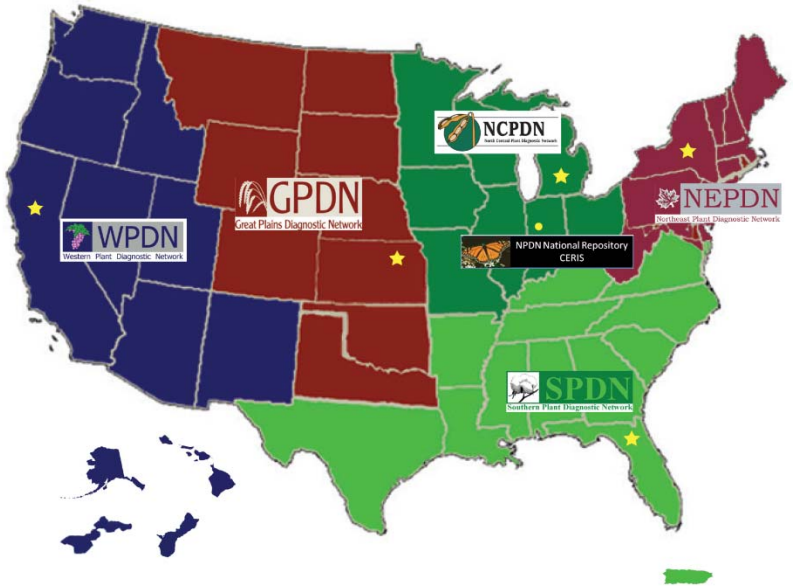
Communications on new outbreaks often poorly coordinated and inadequate.

Funding and infrastructure supporting plant diagnostics in the country had diminished to a point that many diagnostic laboratories were:

- understaffed,
- ill-equipped and,
- in some cases, threatened with closure.

Mission

The National Plant Diagnostic Network is a premier diagnostic system with the ability to quickly detect and accurately identify plant pests and pathogens and to communicate timely and accurate information



Mission of Cooperative Extension

http://nifa.usda.gov/extension

Extension provides non-formal education and learning activities to people throughout the country — to farmers and other residents of rural communities as well as to people living in urban areas.

It emphasizes taking knowledge gained through research and education and bringing it directly to the people to create positive changes.

What Extension Does

- Translate science for practical application
- Identify emerging research questions, find answers and encourage application of science and technology to improve agricultural, economic, and social conditions
- Prepare people to break the cycle of poverty, encourage healthful lifestyles, and prepare youth for responsible adulthood
- Provide rapid response regarding disasters and emergencies
- Connect people to information and assistance available online through eXtension.org (and other sources)

NPDN and Extension

Plant diagnostics part of LGU Extension mission

- Extension is trusted by growers and the public

Diagnostics - another “front door” to the resources of the Land Grant Universities

- Diagnostic protocols are based on research
- Recommendation options from diagnostic results are based on research
- First Detector and related educational programs

Why an NPDN?

Prevention

- Can't prevent all introductions so **contain** and **eradicate** once introduced

Detection network essential for rapid and effective response

Accurate diagnostics is essential!

- Significant consequences for false positives and false negatives

Given the disbursed and exposed nature of agriculture the detection network must be **distributed**.

Impacts on Extension and Diagnostics

The impacts of the NPDN on Diagnostics positively impacts Extension

- Lab functions
- Training opportunities for diagnosticians
- Educational opportunities for citizens
- Building strategic connections and communications
- Building a database of diagnoses

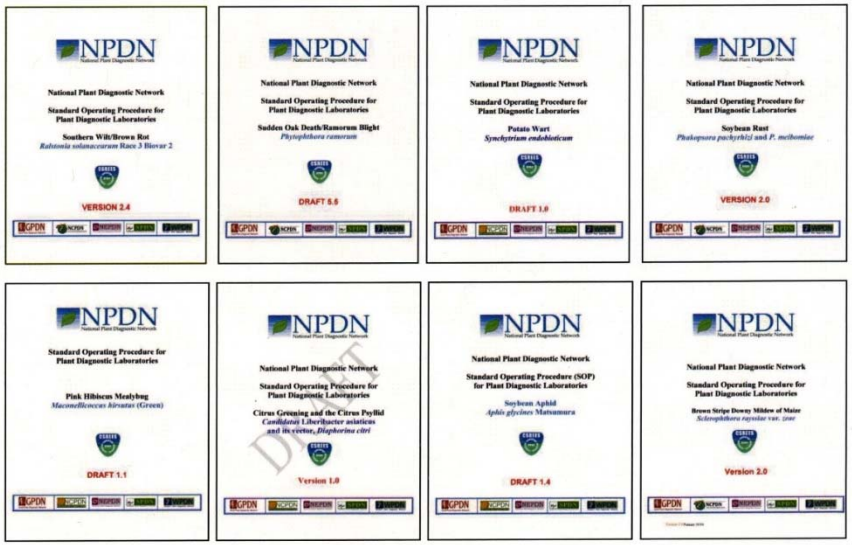
Lab Functions

Diagnostic Support

- Infrastructure
- Training
- APHIS Proficiency panels for authorization for diagnostics of high consequence pathogens
- Lab Accreditation: Star D
  - Quality Management System Workshops
  - GAP Audit and Document Review
- Increased capacity for surge and emerging issues
  - Ramorum blight
  - Plum Pox Virus
  - Soybean rust

Support and Infrastructure

The NPDN provides science-based, peer-reviewed standard operating procedures and laboratory quality standards in plant diagnostics for rapid confirmation.



Infrastructure upgrades:

RT-PCR
Biosafety cabinets
Microscopy

Training and Educational Opportunities for Diagnosticians

Beltsville Training

- PPV
- HLB
- *Ralstonia*
- *P. ramorum*
- Bioinformatics
- Potato Cyst Nematode
- Soybean rust

Regional Workshops

- Entomology
- Molecular tools for soybean diseases

GPDN webinars

Profession development opportunities

Educational opportunities for citizens

First Detector Training Modules

- Mission of the NPDN
- Monitoring for High Risk Pests
- Diagnosing Plant Problems
- Submitting Diagnostic Samples
- Photography for Diagnosis
- Disease and Pest Scenarios

Over 11,000 First detectors trained and registered

Over 13,000 presentations and publications

Over 9 Million people reached though presentations

Building Strategic Connections
Partnerships

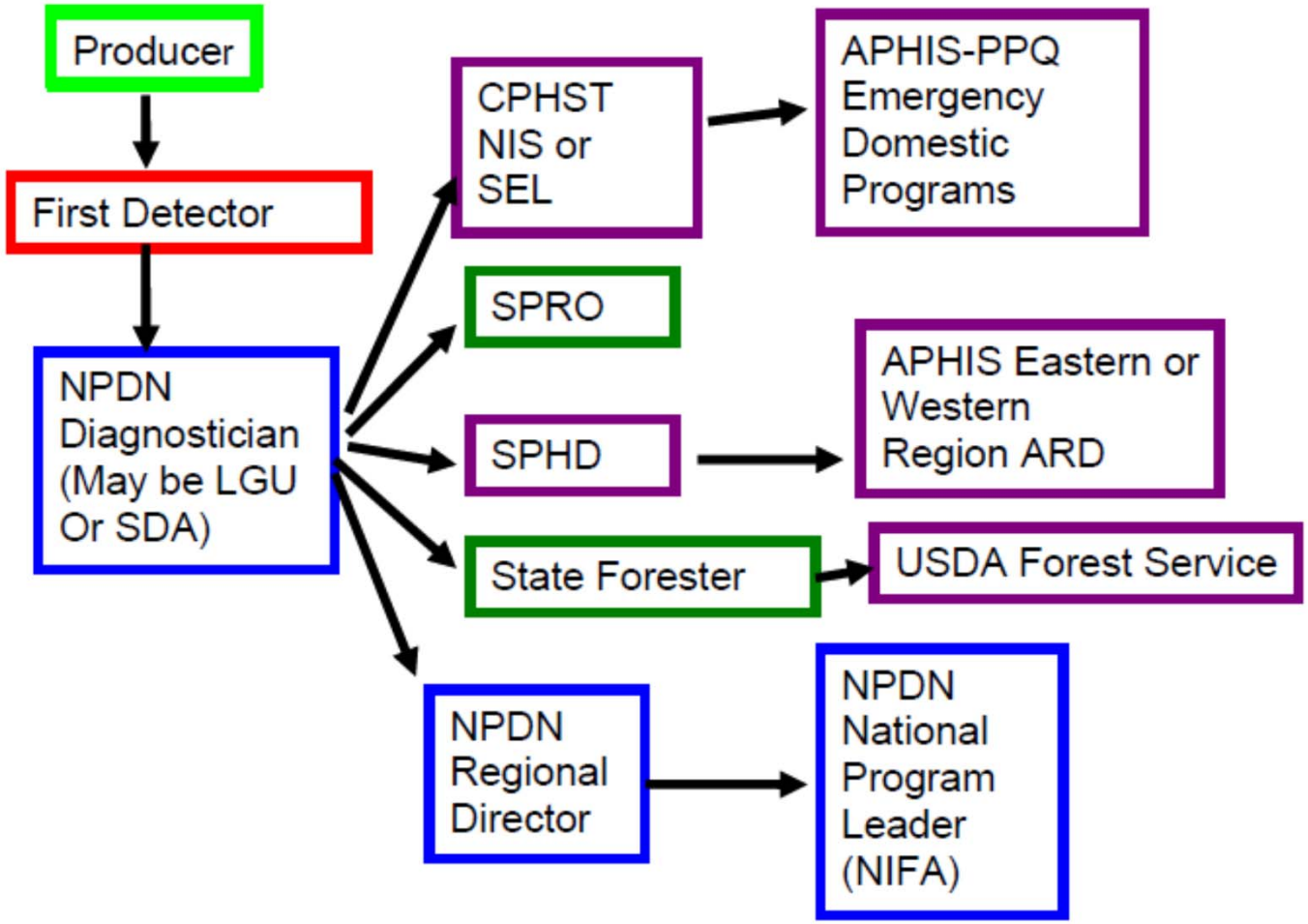
- USDA-NIFA
- USDA-APHIS
- USDA-ARS
- USDA-Forest Service
- Land Grant Universities
- American Public Gardens Association
- APSnet
- EDEN
- Homeland Security
- Integrated Pest Management
- IPM PIPE
- NAPIS
- National Plant Board
- Protect U.S.
- Research Community

Building Connections

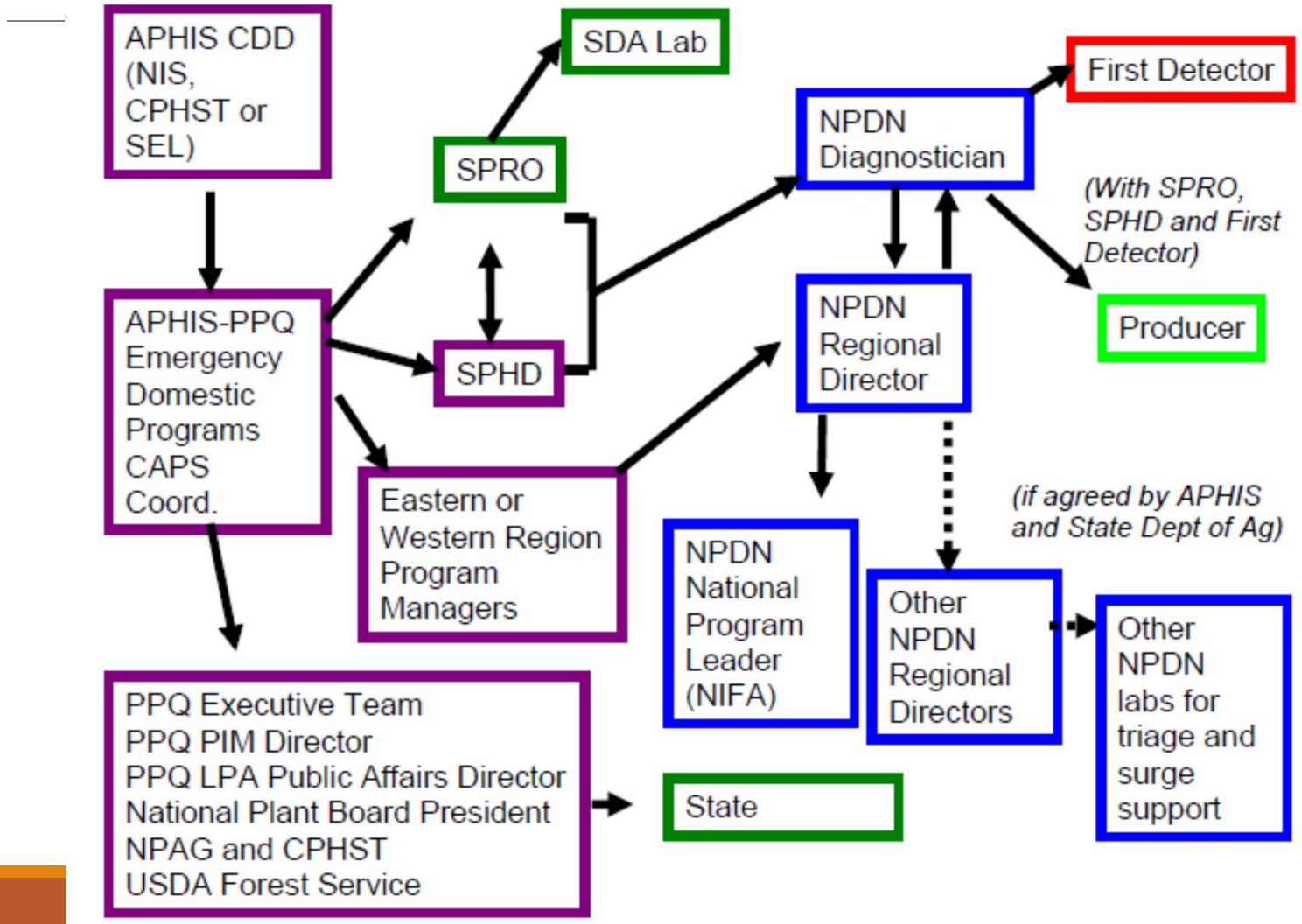
The NPDN fosters interagency communications among scientists at universities, state departments of agriculture, and USDA/APHIS, thereby focusing critical expertise on new and emerging plant pests and diseases

- APHIS and National Plant Board representative on NPDN Operations Committee
- Interactions between NPDN, SDA and APHIS laboratories
- Exercise Scenarios

NPDN Notification: Presumptive Positive



NPDN Communication Flow Chart Confirmation Results



Building Connections

Newsletters

Presentations

Educational programs

NPDN News

Volume 11 Issue 2, February 2016

NEW NATIONAL PLANT DIAGNOSTIC NETWORK PORTAL

Mike Hill & Eileen Luke, CERIS, Purdue University

A new version of the NPDN portal (www.npdn.org) will be rolled out on March 1, 2016. The software has been updated and this version of the portal incorporates several changes. The site will more seamlessly support responsive design making it more mobile friendly. All of the existing regional portals (gpdn.org, ncpdn.org, nepdn.org, sepdn.org, and wpdn.org) have been merged into one overall national site (www.npdn.org) which will reduce the maintenance and support efforts in the coming years.

...article continues on page 2.

Figure 1: New NPDN portal at www.npdn.org.

USDA Secretary Vilsack Announces $58.25 Million to Protect Agriculture and Plants from Pests and Diseases through 2014 Farm Bill Section 10007*

APHIS Newsroom

On February 11, U.S. Department of Agriculture Secretary Tom Vilsack announced that USDA's Animal and Plant Health Inspection Service (APHIS) has allocated $58.25 million from Section 10007 of the 2014 Farm Bill. This money will support 434 projects that prevent the introduction or spread of plant pests

...article continues on page 4.

NPDN
National Plant Diagnostic Network

Issue Highlights

- New ITP identification tool: Hawaiian Scarab ID: Scarab and Stag Beetles of Hawaii and the Pacific
- Upcoming Sentinel Plant Network workshops

Diagnostics Data and Lab Management Systems

NPDN National Data Repository

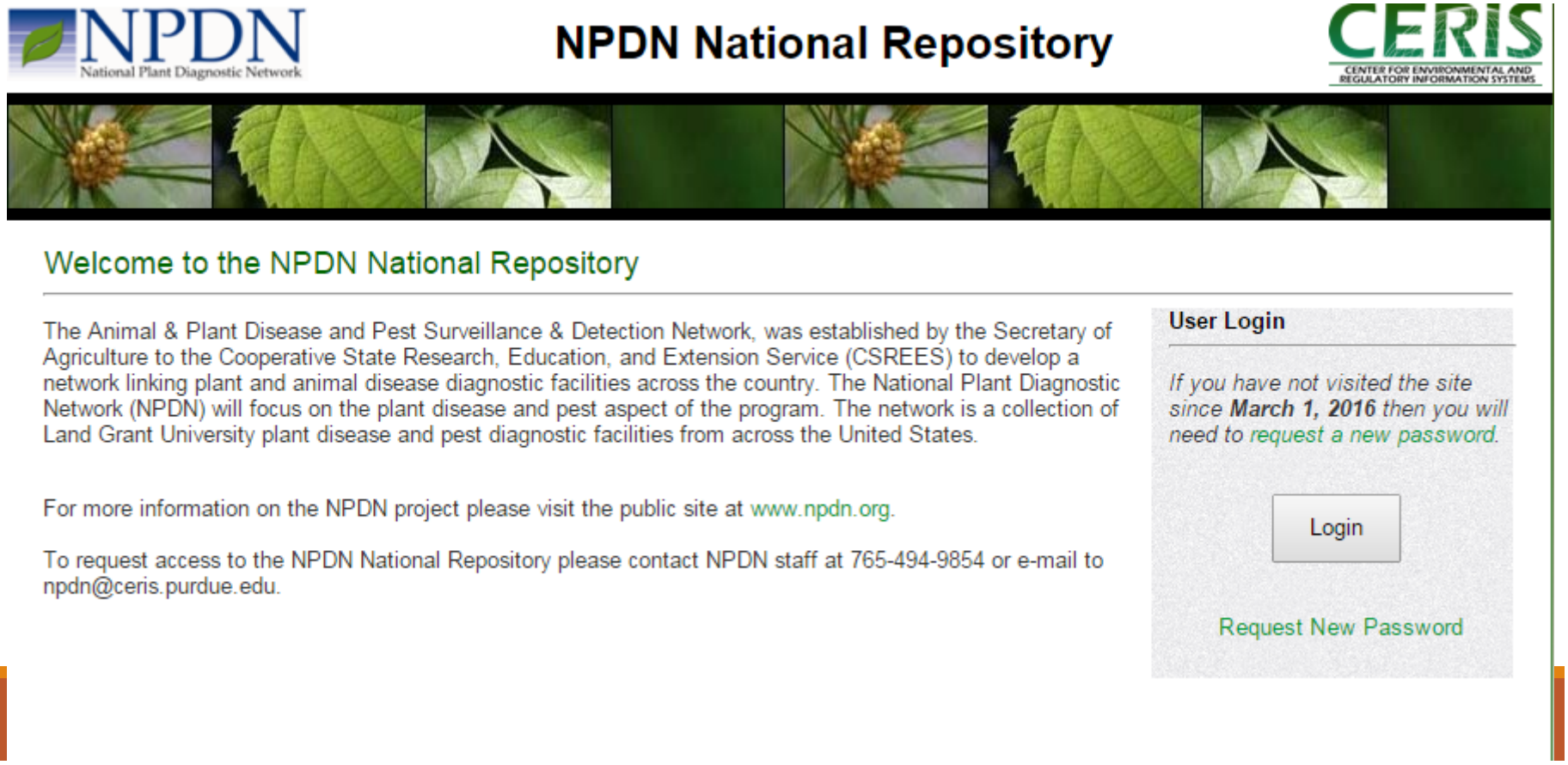
Tool development at NDR

Lab Management Systems

- PDIS
- PClinic
- DDDI

NPDN National Data repository at CERIS

Established for records of endemic and emerging pests and diseases.



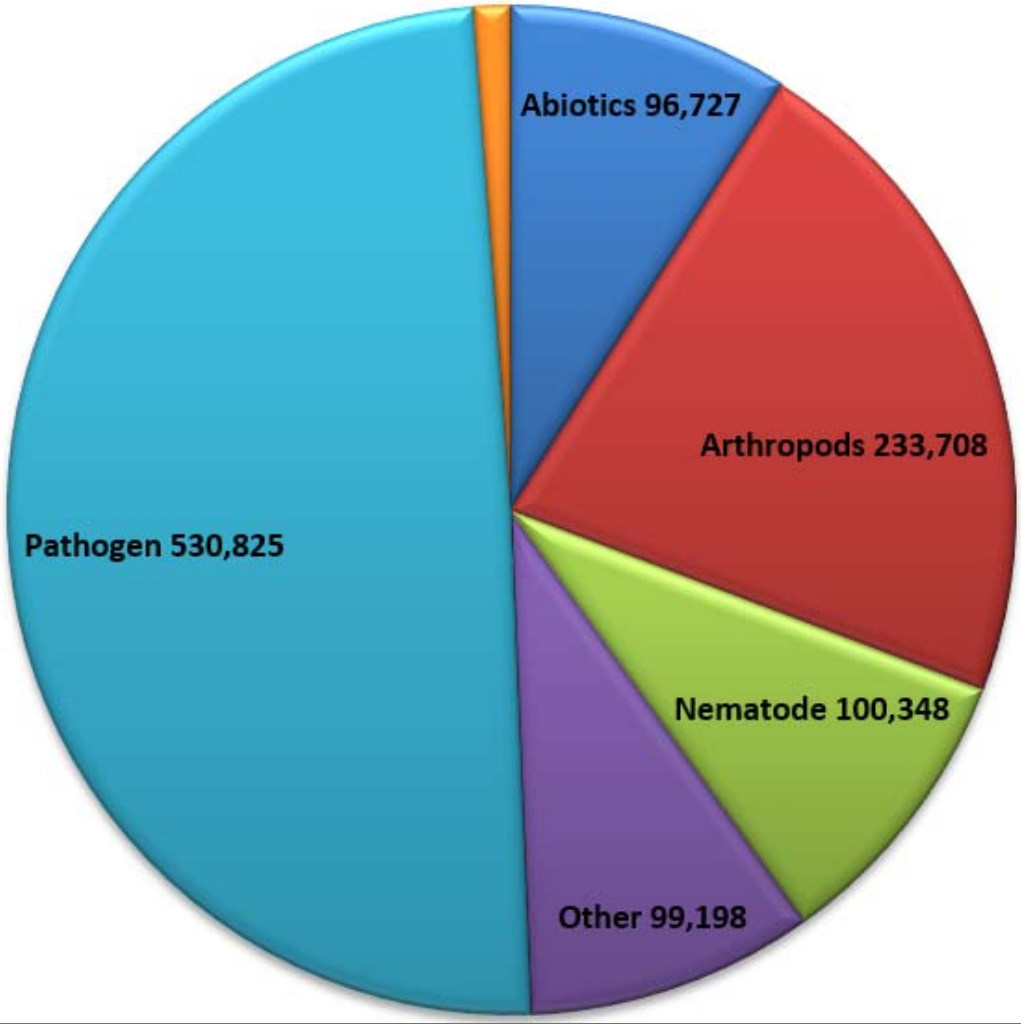
Building a Database of Diagnostics

Samples	Diagnoses	Pests	Hosts	Counties	Diagnostic Labs
942,139	1,183,041	11,555	3,461	3,161	172

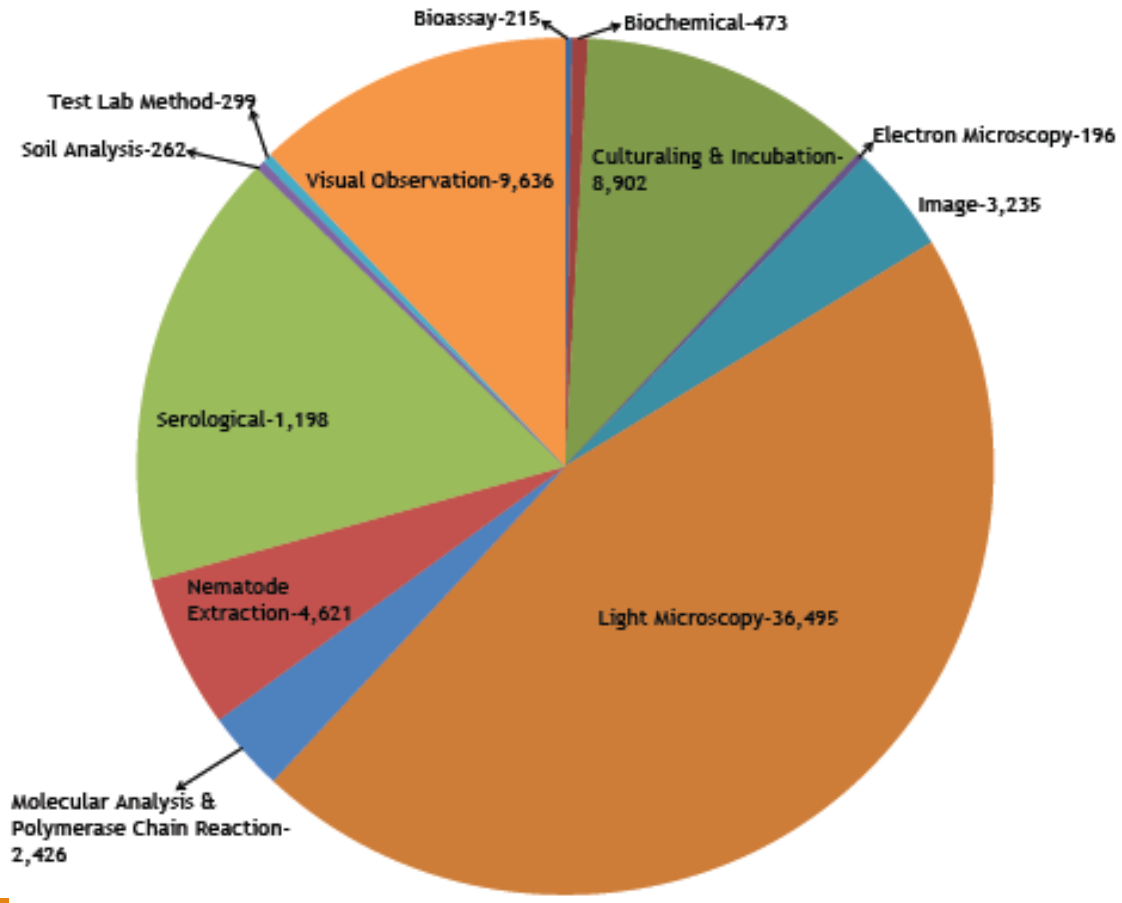
NPDN Regional Report, Count of Diagnoses by Year Sampled							
Year Sampled	GPDN	NCPDN	NEPDN	SPDN	WPDN	Industry	Total
2004	1,076	80	608	1,013	3,811	0	6,588
2005	5,606	9,452	20,318	12,334	7,566	0	55,276
2006	10,684	16,794	29,233	17,535	8,522	0	82,768
2007	12,135	23,666	56,396	19,182	15,578	247	127,204
2008	16,177	15,627	10,497	23,286	20,995	5,297	91,879
2009	21,594	18,780	14,237	25,560	47,874	8,400	136,445
2010	16,863	23,669	13,608	22,752	21,179	7,452	105,523
2011	14,499	25,786	11,122	25,650	22,899	7,182	107,138
2012	13,316	29,950	12,217	25,700	33,036	8,211	122,430
2013	12,257	27,864	13,896	24,589	16,023	8,163	102,792
2014	12,478	25,692	19,051	29,842	12,081	9,255	108,399
2015	19,939	26,600	14,862	29,585	12,132	8,582	111,700
2016	7,646	660	1,012	1,591	352	376	11,637
Totals	164,270	244,620	217,057	258,619	222,048	63,165	1,169,779

1232 First Detections

Types of Data in the Repository Pathogens and Pests



Diagnostic Methods



Connection with Research is Essential

Development of new diagnostic techniques

Disease and pest reports stimulate research on management and pest/pathogen biology

Data collected supporting epidemiology

- Shifts in pest/pathogen populations

Pest and disease detection supported by research on management

Diagnostics core to IPM

Impact of No NPDN

Fewer diagnosticians trained

- Reduced capacity to address disease and pest outbreaks
- No diagnosticians = No diagnostic labs

Loss of highly trained staff with specialized expertise

Decreased information on pests and diseases for state Extension efforts

Lack of triage support for USDA

Reduction in state-to-state communications regarding introductions of new and emerging pests and diseases

More invasive pests and pathogens will go undetected until it is too late to remediate the problem

Fewer jobs and less economic stability due to reduced export of plant-based products

Accomplishments

Diagnostic infrastructure supporting plant diagnostic labs and clinics in the U.S. is greatly enhanced for both capability and capacity.

Diagnosticians are well trained in modern diagnostic technologies

National Repository established for records of endemic and emerging pests and diseases.

Secure communications protocols established among NPDN labs and regulatory agencies.

Accomplishments

NPDN labs routinely support national, state, and local response to disease and pest outbreaks

- Providing surge capacity and triage assistance for high consequence samples.

Educating First Detectors and many others

Overall

LGUs and diagnostic efforts are an integral part of Extension
- Extension has a history of trust with growers and public

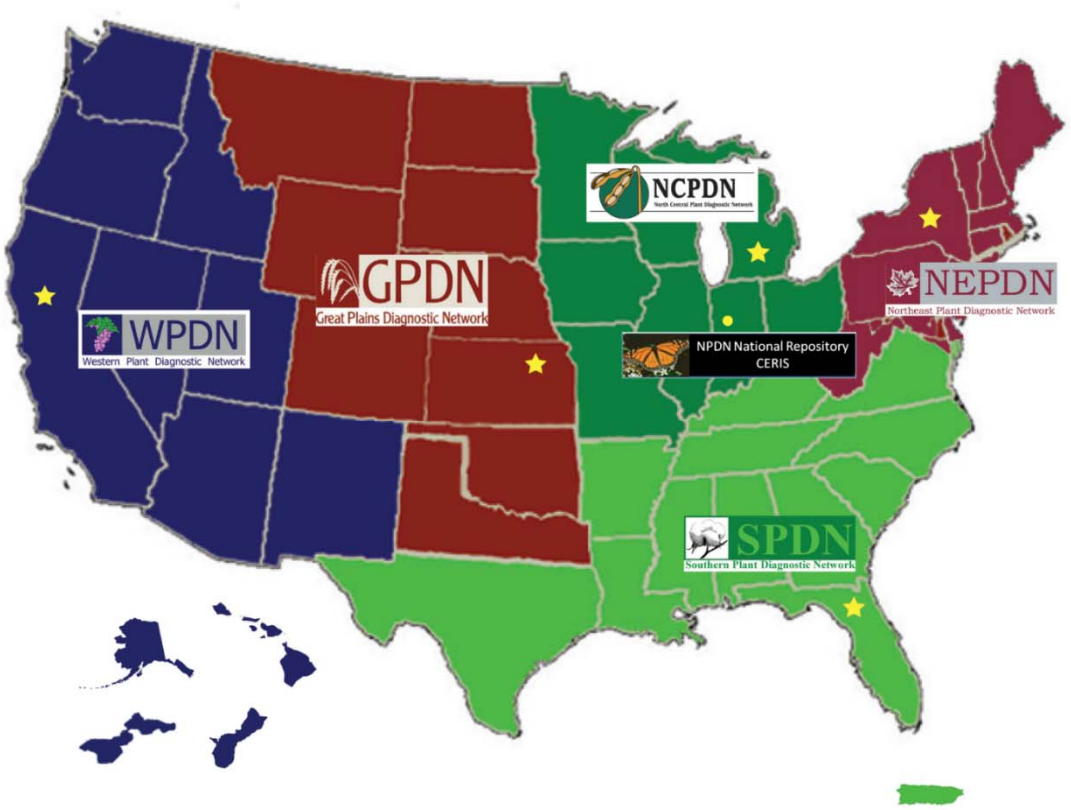
Diagnostic labs key to the success of NPDN
- NPDN provides the diagnostic support to allow for the success for plant industries and other clients

Two-way connections between NPDN labs and stakeholders
- Sample submission, diagnostics and information flow
- Connections with Extension Educators and Specialists, SDAs and APHIS
- Development of educational materials

Land Grant University connections
- Allows for direct connection with faculty researchers and Extension specialists

NPDN labs have regional and national connections with other labs
- Allows for more rapid assistance and sharing of expertise

www.NPDN.org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