

# The National Plant Diagnostic Network Diagnostics Program Area Committee



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## Abstract

Since its establishment in 2003, the Diagnostics Program Area Committee (PAC) has focused on a number of different initiatives including communication between diagnosticians, lab acquisition of USDA permits, creating standard operating procedures (SOPs) for diagnosis of significant regulated pathogens, coordinating select agent workshops, coordinating laboratory surge capacity, developing a basic techniques workshop for diagnosticians, and creating a working group to assist in the creation of the STAR-D laboratory accreditation program. The committee, in collaboration with our USDA and University partners, also has developed a series of workshops conducted at the USDA laboratory in Beltsville, MD that train NPDN diagnosticians to use morphological and molecular testing for highly significant pathogens. The primary focus of the diagnostic program area committee is to provide diagnosticians with opportunities and information necessary to achieve the NPDN mission of providing timely, accurate diagnostics. Our committee members strive to keep NPDN diagnosticians and collaborators informed and prepared for identifying new pathogens, processing significant events and recognizing behavioral modifications in endemic pathogens and pests.

## Educating Diagnosticians

The success of NPDN depends upon the competence of its diagnosticians. The NPDN Diagnostics PAC has facilitated educational opportunities for diagnosticians, ranging from a basic techniques workshop for new diagnosticians to specialized training for new and emerging pests and pathogens.

## Basic Techniques

In 2010, 50 NPDN pathologists attended a basic techniques workshop at Penn State that was designed to help inexperienced diagnosticians develop their skills and also provided opportunities for experienced diagnosticians to refine their skills. Attendees also had the option to stay for a separate *Fusarium* identification training workshop.



## Advanced Techniques



The NPDN and the Diagnostics PAC collaborate annually with the USDA-APHIS-PPQ-CPHST National Plant Pathogen Laboratory Accreditation Program Laboratory in Beltsville, MD to train NPDN diagnosticians in USDA-validated diagnostic techniques for high consequence pathogens including fungi, oomycetes, bacteria, nematodes, phytoplasmata, and viruses. A two-part bioinformatics workshop also is offered.

## Entomology Training

The NPDN Diagnostics PAC has lead training workshops for diagnostic entomologists, and also has collaborated with USDA-APHIS-PPQ to provide entomology training. 15 workshops have been conducted on high consequence insect pests.



## Standardization and Quality Management

Standardized methods and uniform quality standards are necessary to ensure that the independent labs that compose the NPDN achieve accurate and reliable diagnostic results, and that those results are properly and consistently reported. The Diagnostics PAC contributes to standardization and quality management by writing standard operating procedures (SOPs), collaborating with the National Plant Pathogens Laboratory Accreditation Program (NPPLAP), and the NPDN System for Timely, Accurate, and Reliable Diagnostics (STAR-D) lab accreditation process.

## Standard Operating Procedures (SOPs)

SOPs are detailed written instructions intended to ensure uniform performance of a diagnostic procedure. NPDN Diagnostics PAC members have authored 11 diagnostic SOPs for high consequence pathogens and insects. These SOPs have been verified by USDA-APHIS-PPQ and are available to NPDN members on the NPDN website. Diagnosticians are currently writing 6 more diagnostic SOPs.

## Lab Proficiency Testing

NPDN labs can choose to become provisionally approved by the USDA-APHIS-CPHST National Plant Laboratory Accreditation Program (NPPLAP) to test for specific pathogens of high consequence. Labs that pass the NPPLAP proficiency panel become approved and can assist with surge samples or serve as verification labs for NPDN and USDA. The NPDN Diagnostics PAC supports proficiency testing by producing USDA-validated protocols that are used by the proficiency panel. Currently there are 90 individuals in 27 labs who have been provisionally approved to verify one or more pathogens of high consequence, including *Candidatus Liberibacter asiaticus*, *Phytophthora ramorum*, and Plum Pox potyvirus.

## STAR-D NPDN Laboratory Accreditation



The team that developed the STAR-D system for NPDN lab accreditation included a few members of the NPDN Diagnostics PAC. STAR-D provides templates to assist individual NPDN labs in the development of lab quality manuals, quality procedures, work instructions and forms. While each lab is unique in its operation, STAR-D accredited labs meet uniform NPDN standards for conformity of test results, sample handling and reporting. Some Diagnostics PAC members also have participated in STAR-D lab auditor training.



## Collaborative Resources for Diagnosticians

The University of Georgia Center for Invasive Species and Ecosystem Health and the NPDN Diagnostics PAC have collaborated to produce several diagnostic resources that are hosted on the Center's Bugwood wiki.

## Diagnosticians Cookbook

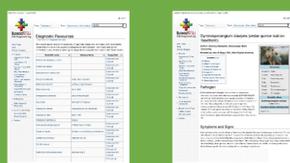
- The Diagnosticians cookbook contains recipes and instructions for making culture media, as well as instructions for a variety of diagnostic tests. Members of the NPDN Diagnostics PAC have not only contributed content to the website, but also have reviewed 19 recipes which now bear a seal stating that the protocol has been reviewed by the NPDN Diagnostics Committee.



- The Cookbook site also contains links to 31 diagnostic tips contributed by NPDN diagnosticians.

## Diagnostic Factsheets

NPDN Diagnosticians, including members of the Diagnostics PAC, contributed images of pathogens, signs and symptoms which are on the Bugwood wiki "Resources for Diagnosticians" webpage. The images also are incorporated into diagnostic factsheets, many of which were authored by NPDN Diagnosticians and members of the Diagnostics PAC.



## Communication and Readiness

- The Diagnostics PAC meets via conference call 6 or more times a year. Minutes are posted to the NPDN website. The committee has 22 members representing all 5 regions of the NPDN, as well as industry collaborator Agdia, Inc. and collaborators from USDA-APHIS-PPQ-CPHST.
- As NPDN prepares to enter its second decade, the Diagnostics PAC initiated a conversation via webinar with the National Database PAC to address discontent expressed at the October, 2015 Diagnosticians/IT meeting with regard to diagnostic confidence levels and how the data is reported by the NPDN National Data Repository. The webinar resulted in the formation of a small ad hoc committee, consisting of Diagnostic and National Database PAC members, that was tasked with designing a survey of the NPDN membership to assess the opinion of how current diagnostic confidence levels are defined, interpreted, how that data is handled by the National Data Repository, how the data is presented in reports, and soliciting suggestions for improvement. The two committees will analyze the results, formulate suggestions for improvements and present them to the NPDN membership at large for discussion at the 2016 NPDN national meeting.
- The NPDN Diagnostics PAC has collected surge capacity data from every state to determine the resources available to handle a sudden surge in sample volume as might occur in the event of a select agent find. An update to this survey is planned.