

NATIONAL PLANT DIAGNOSTIC NETWORK

FIVE-YEAR REVIEW

Report Of The Review Panel

EXECUTIVE SUMMARY

June 12, 2007

Executive Summary

“If the network ceased to exist, it would need to be reinvented. The speed of distribution of potential harmful pests, pathogens and invasive species has never been greater due to multiple natural events and human activities.” *Anne K. Vidaver, Professor, University of Nebraska, Review Team member*

The National Plant Diagnostic Network (NPDN) was established by the U.S. Dept of Agriculture, Cooperative State Research Education and Extension Service (USDA CSREES) from federal funds in 2002, to provide diagnostic capability to the nation’s agricultural system. Initial efforts were focused upon establishing five regional hub labs at Land Grant Universities (LGU’s) representing the Northeast, Western, Southern, Great Plains, and North Central regions, which were conceived to address differences in agricultural production systems in the respective regions. The five regional centers are located at Cornell University (Northeast Region), Kansas State University (Great Plains Region), Michigan State University (North Central Region), University of California at Davis (Western Region), and the University of Florida (Southern Region). A computer database, the National NPDN Data Repository, was established at Purdue University to house data generated by the network. Committees have been established to address major functional areas of the network (Diagnostics, Funding, Public Relations, Epidemiology, and Training), and responsibility for these delegated areas is assigned at the regional level. The network has rapidly expanded since 2002 to encompass diagnostic clinics at LGU’s and a number of state departments of agriculture in all 50 states and Puerto Rico, with partner clinics in American Samoa, Guam, and Palau.

The mission of the NPDN is centered upon national agricultural security, being charged with rapid detection, diagnosis, and early communication of outbreaks of high priority plant pathogens. The network coordinates and communicates with county and state extension agents, state departments of agriculture and the U.S. Dept of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine (USDA APHIS PPQ) during outbreaks in implementing its mission. Training of first responders and diagnosticians is an essential component of the NPDN, ensuring that the network is prepared for the scope of its mission in the event of an outbreak.

In January of 2007, the National Plant Diagnostic Network (NPDN) Executive Committee convened a review panel, consisting of professional representatives from major stakeholders and partners of the NPDN, to conduct a critical review of all facets of the NPDN at the National NPDN Meeting In Orlando FL (See:

<http://www.plantmanagementnetwork.org/proceedings/npdn/2007/>).

The Review Panel met and communicated with NPDN representatives, partners, and stakeholders, and developed this report to address NPDN mission, scope, accomplishments and challenges. Much of the output from the National Meeting serves as the core of this review document, and should serve as the basis for future development and refinement of the network and its associated systems, partnerships and structure. Analysis and specific recommendations are provided for future improvement of the Network.

A. Diagnostics

The implementation of the NPDN reversed a trend of dwindling resources dedicated to diagnostics of plant related problems. The NPDN has brought a renewed emphasis to, and enhancement of, diagnostics at Land Grant Universities, and has started to provide an infrastructure for the rebuilding of the linkages between the diagnostic laboratories and extension, regulatory agencies, and the broader community of agricultural practitioners.

The NPDN has benefited from the continuing support of CSREES, resulting in substantially increased support for diagnostic laboratories. This has in turn resulted in increased technical competency and implementation of advanced diagnostic technologies at the diagnostic laboratories, primarily housed in Land Grant University diagnostic clinics. Funding increases have allowed respective state diagnostic clinics/laboratories to continue to build both personnel and equipment infrastructure and this has improved sample handling efficiency as well as morale. The leveraging of both state and federal dollars has been viewed as a positive by USDA Administrators and has served to market the NPDN as a “flagship initiative”.

As a result of the infusion of funds, infrastructure, human resources and technology, the NPDN has significantly contributed to the detection and diagnosis for several recent APHIS-listed “Select Agent” and high profile plant pathogen introductions, resulting in the protection of U.S. agricultural systems, and in reduction of damage to producers and natural ecosystems at the national level.

Challenges still exist in the development and application of accreditation standards for diagnostic labs, to ensure recognition and acceptance of data by states, regulatory agencies and partners. This issue is being actively addressed by the NPDN leadership and diagnosticians, who are working together with USDA-APHIS and USDA-CSREES toward a National Plant Protection Accreditation Program. While accreditation and certification are significant steps toward addressing the issue of sample load sharing at the regional and national level, the NPDN is still not optimally prepared for the event of a national-scale outbreak and associated sample surge. The Panel recommends that the NPDN leadership establish practices for monitoring of laboratory workload against lab capacity, and develop a sample referral process to effectively utilize the capacity of the Network in the event of a surge.

B. Education and Training

A vast network of first responders has been developed and is rapidly expanding down to the local level, fulfilling one of the primary visions of the network. Training is a primary focus of the network and is accomplished at the national, regional and state level with effectiveness, applying a “train-the-trainer” philosophy. Online scenario-based training has been implemented with online access, and Standard Operating Procedures are in place on the internet for open access.

C. Information Technology

NPDN has achieved one of the primary goals of the program in the creation and implementation of a national diagnostic database. The national database promises to be an important tool in rapid

response, but only if efforts for real-time analysis of disease and pest incidence information are begun to detect patterns and anomalies.

Significant challenges still face the network and associated national plant pathogen and pest databases, in developing a unified national plant health database system capable of recording surveillance, detection and diagnostic information, and delivering appropriate information to agencies and partners for use in rapid response to, and recovery from, harmful pathogen and pest introductions. The challenges faced by the NPDN in the area of Information Technology (IT) and communications are rooted in the size of the network and the diversity of its components and partners. Information security and sharing continue to be the primary challenges faced by NPDN.

The review team recommends that NPDN leadership designate a fulltime chief information officer (CIO) with policy and oversight responsibilities for IT at the national and regional levels. The CIO should develop a national IT strategic plan detailing steps to achieve baseline IT capabilities and security at all network labs. The CIO should work with the Advisory Council (see below) and NPDN leadership to establish an information sharing policy. The policy must include clear guidelines for data access by researchers and reporting of findings to end-users.

D. Governance and Funding

The review team was pleased to note that an effective governance and operational structure was in place and that USDA/CSREES has established a unified network of public agricultural institutions to identify and respond to introductions of high risk plant pathogens. The establishment of five regional centers and directors within the NPDN Network was viewed as an excellent first step in developing an effective communication system. Competent, energetic regional coordinators have developed a true spirit of “teamwork” both within and across the regions and are also working toward improving working relationships with respective state departments of agriculture and appropriate USDA personnel.

The need to continue to increase base funding for all regions was recognized as a major challenge with decreased or level federal budgets. There is a need to ensure that efficiencies in funding (especially supplemental funding) flow are operating in all regions so that individual labs are not left with un-reimbursed diagnostic costs or funding shortfalls.

Managing and pre-planning for diagnostic sample surge capacity is still a challenge across and within all regions. The development of a strategy in partnership with the Integrated Consortium of Laboratory Networks to address resources required to deal with sample surge associated with a large-scale pathogen introduction should be given high priority by the leadership.

The review panel strongly recommends the establishment of a broad-based NPDN Advisory Council at both the national and regional level, to include representatives from the private sector, state/county extension, experiment station/research faculty, Certified Crop Advisors (CCA's), state/federal regulatory agencies and National Plant Board affiliates. An Advisory Council representative of the members, stakeholders, and partners will help the network to address challenges in surge capacity, information sharing, resource management and strategic planning.

The Advisory Council, NPDN Executive Committee and CSREES National Program Staff should

be charged with consideration of and the development of a five-year transition to a competitive funding model.

E. Partnerships

The NPDN has profited from a commitment to forging strong partnerships between regional and state diagnosticians. All five NPDN regions have made great strides in developing strong partnerships and providing training for CCA's, Pest Control Advisors (PCA's), county extension staff, and other first responders. Most prominently, a solid foundation for operating NPDN partnerships exists with the Integrated Pest Management (IPM) Center Network, with which the NPDN has formed formal partnerships in several regions. The successes of the Soybean Rust Information System, developed in partnerships with the USDA agencies, state departments of agriculture, industry partners and the Land Grant Universities, has been expanded in the development of the -Integrated Pest Management Pest Information Platform for Extension and Education (IPM-PIPE), a sentinel system and data management decision tool that will serve as a model for partnership between the NPDN and most, if not all, interested federal, state and private interests.

Recent select agent incidents such as the arrival of soybean rust and *Ralstonia solanacearum* Race 3 biovar 2 have provided an opportunity for extension personnel, CCAs, state regulators and diagnostic clinicians to exercise Incident Command System (ICS) maneuvers and challenge existing communication and diagnostic systems. Additionally, these incidents have identified needed resources and prompted development of sampling and diagnostic mechanisms. The need to develop surge capacity for soybean rust, *Ralstonia solanacearum* Race 3 biovar 2, and *Phytophthora ramorum* has encouraged critical working relationships between scientists and administration with the diagnostic labs, State Plant Health Directors (SPHD's), State Plant Regulatory Officials (SPRO's), APHIS-PPQ Center for Plant Health Science and Technology, and APHIS-PPQ Plant Pest Diagnostics Service units. These are initial steps toward a fully integrated plant security system that point to the potential partnerships and their ability to harness the necessary capacity and imagination to safeguard U.S. agriculture.

While some progress has been made in engaging state and federal regulatory agencies, much potential exists in forming additional productive partnerships. State and federal partners are responsible for excluding and eradicating regulated plant pests. In most states significant progress has been made in improving the level of trust between regulatory agencies and extension and diagnostic personnel. However, a greater level of ongoing interaction and communication is necessary to tighten the safeguarding safety net and assure that responses are rapid and accurate. The diagnostic/education/regulatory partnership must recognize the importance of business confidentiality, diagnostic challenges, and the need to minimize potential threats through quarantines and other restrictions.

The diagnostic/education/regulatory partnerships could be more effective by including an industry component. Primarily due to concerns about confidentiality or lack of communication, these partnerships have not been extensively pursued and developed. CCA's, PCA's, representatives of seed, fertilizer, and pesticide manufacturers, and scouts/field representatives for commodity groups and processors work directly with producers, giving them unique

environmental and pest pressure information. These partnerships will not only provide for earlier detection of pests, but allow unique communication and response opportunities based on existing levels of trust.

F. Public Relations and Outreach

The NPDN has engaged in structured Public Relations efforts since its inception, and has established an active Public Relations Committee. Efforts have included the development of a variety of promotional print and electronic materials, highlighting national and regional activities, laboratory capacity and disease-specific information. National and regional newsletters, brochures, and websites have been effectively deployed to distribute information. In a notable example of outreach activities, NPDN partnered very effectively with commodity groups, check off-funded organizations and USDA agencies to develop very effective materials on soybean rust identification and management. The NPDN websites provide quality information on new disease issues and outbreaks in a user-friendly interface (<http://www.NPDN.org>).

Despite three years of continuous effort, some potential partners and stakeholders are still not knowledgeable about the NPDN mission and activities. It is imperative that state, regional and national NPDN members identify and engage new audiences, while sustaining the interest of existing partners and stakeholders. A top priority must be to further educate commodity groups, private industry and other plant industry stakeholders on the mission, scope and activities of the NPDN, and engage them as partners. Not all University administrators currently view the NPDN as a primary partner capable of contributing to their current strategic goals. Some diagnosticians and administrators in state Departments of Agriculture perceive NPDN labs as a parallel effort, and some state diagnosticians do not grasp how they could interact with their NPDN cohorts. The NPDN should develop a formal Public Relations strategy, with strategic goals at the national, regional and state levels. To support this effort, the NPDN leadership and Public Relations Committee should develop a framework and process for annual self-evaluation that will help to focus strengthening activities, including reporting topics and formats, and metrics for recording and reporting performance.

G. Integration with Research

The role of the NPDN is not to conduct research, per se. However, consistent with the Land Grant mission of translating research to practice and providing feedback from stakeholders to the research enterprise, NPDN can play a central role in defining data gaps and prioritizing research needs to fill those gaps. In this role, the NPDN receives “inputs” from the research community and generates data “outputs” useful to researchers in plant pathology and plant health management. The NPDN has developed formal relationships with IPM-PIPE for analysis of NPDN diagnostic data on soybean rust and the soybean aphid that serve as outstanding models for the relationship between diagnostics and research.

H. Pathway to Future Success

The review team was very favorably impressed with the progress made in all facets of the NPDN’s national, regional and state infrastructure, human resources, and technology in the short span of five years, with a relatively modest national budget. The NPDN is still in its infancy, experiencing growing pains, and maintaining or increasing the current level of support will be

vital for the network to address in order to become a fully mature, functioning distributed system of accredited laboratories.

The NPDN benefits as a network largely because of the dedication and efforts of the NPDN leadership, and because the diagnosticians at the core of the network actively participate, contribute and feed back their ideas and vision to the leadership. This was particularly evident at the Five-Year Review Meeting in Orlando, where members, partners and federal agency representatives held a vibrant, open discussion on all of the opportunities and challenges ahead.