



Impacts of the National Plant Diagnostic Network

Program and Mission

- The NPDN focuses on the early detection, accurate diagnosis, and rapid communications needed to help mitigate the impact of endemic, emerging, and exotic pathogens and pests that attack agricultural, forest, and landscape plants in the U.S.
- The NPDN's mission is accomplished through a coordinated network of diagnostic laboratories and experts at land grant universities, state departments of agriculture, and industry developing and deploying regionally and nationally coordinated programs in diagnostics, training and education, and response.

NPDN Record of Achievement

Prior to the NPDN:

- Information on new pests and diseases was often scattered.
- Communications on new outbreaks were poorly coordinated and inadequate.
- Funding and infrastructure supporting plant diagnostics in the country had degraded to a point that many state and university laboratories were understaffed, ill-equipped and, in some cases, threatened with closure.

NPDN Accomplishments

- National Repository established for records of endemic and emerging pests and diseases.
- Secure communications protocols established among NPDN labs and regulatory agencies.
- Diagnostic infrastructure supporting plant diagnostics in the US is greatly enhanced for both capability and capacity. Diagnosticians are well trained in modern diagnostic technologies and molecular protocols.
- NPDN labs routinely support national, state, and local response to disease and pest outbreaks.
- NPDN serves as a model for efficiency, communication and integration across jurisdictions. In 2010, the NPDN was acknowledged with the **USDA NIFA Partnership Award for Innovative Program Models**. Officials in countries in the Middle East, Latin America, Europe and Canada have expressed interest in developing similar programs.

Consequences of the loss of the NPDN:

- Reduction in the number of adequately trained diagnosticians required to support global and domestic trade in plants and plant products.
- Reduced capability and capacity of plant diagnostic clinics to support early detection, accurate diagnosis, and rapid response to disease and pest outbreaks.
- Loss of highly trained staff with specialized expertise.
- Probable loss of a generation of plant diagnosticians as employment opportunities trend to nonexistent.
- Dramatic reduction in state-to-state communications regarding introductions of new and emerging pests and diseases.
- Delayed detection of invasive pests and pathogens until it is too late to prevent catastrophic losses to the agricultural economy.
- Fewer jobs and less economic stability due to reduced export of plant-based products.
- Reduction in foreign and domestic investment in U.S. agriculture products due to restrictions on trade from quarantined regions.

How the NPDN protects jobs:

- Invasive species cost the U.S. economy an estimated \$120 billion per year; approximately one third of those losses is due to invasive pests and pathogens that attack agricultural and landscape plants.
- Many plant businesses (e.g., nurseries, farms, and seed companies) have a low profit margin; disruption of markets due to a new pest or pathogen can result in a catastrophic loss of revenue, thus threatening jobs and the economies of local communities.
 - Prior to the establishment of the NPDN, a high priority pathogen (Select Agent List) was introduced into U.S. nurseries on contaminated plants imported from Kenya. Over \$1.4 million losses resulted from this one event; some of the affected nurseries went out of business.
 - After NPDN was established, the same select agent was introduced from a source in Central America. NPDN provided the surge capacity needed for rapid diagnoses and the communications protocol to keep officials and stakeholders informed in a timely manner. Critical samples were processed within 72 hours instead of over six weeks. NPDN support enabled the effective deployment of containment and mitigation actions before the pathogen spread to other nurseries, potentially saving many businesses and many millions of dollars.
 - NPDN laboratories provided crucial diagnoses for many tens of thousands of samples during the forensic analysis for a highly infectious pathogen that was shipped across the US from several large California nurseries. The surge capacity provided by NPDN enabled rapid processing of samples and the clearing of nurseries free of the disease so that they could quickly resume operations to release plants for shipment and sale.

How the NPDN protects our food supply and national plant resources:

- NPDN has greatly improved training, diagnostic coordination, and communications resulting in a significantly enhanced diagnostic and surge capability for the country.
- NPDN has funded advanced diagnostic training workshops for over 500 scientists and technical staff nationwide on a variety of diseases and pests, and sponsored entomological workshops on specialized topics.
- Diagnostician training workshops have resulted in new continental, state, and county pest and pathogen reports. Specialists have also used knowledge gained to enhance their local First Detector training, which has had positive impacts on early detection.
- NPDN has trained and registered 11,480 First Detectors nationwide, including all states and U.S. territories.
 - First detections of soybean rust in the U.S. (2004), emerald ash borer in Minnesota (2009), and Asian citrus psyllid in Louisiana (2008) were a direct result of NPDN First Detector Programs.
 - First Detector education also reduced the time between detection and confirmation of high consequence agents from several weeks to as little as a few hours or days in many cases.

How NPDN creates jobs:

- In 2010, plant-based agricultural exports were valued at over \$83 billion, 72% of the total value of agricultural exports, and have the most powerful positive impact on the U.S. trade balance.
- The administration's strategy to stimulate the economy includes plans to double U.S. exports in the next five years. Protection of plant agriculture from exotic pests and diseases is crucial for keeping export markets open, thus improving the livelihoods of farmers and the economies of rural communities.
- The NPDN has worked with state departments of agriculture and USDA APHIS to provide diagnostic support for state CAPS surveys which document that plant products exported from these areas originate from disease/pest-free locations.
- The NPDN creates jobs and training for highly skilled scientists and technical staff.

- In Hawaii, a traditionally underserved state, the University of Hawaii has given high priority to two new positions: an agrosecurity coordinator and an invasive species specialist; over a typical thirty year career this translates into a \$6 million investment in today's dollars, a twelve-fold leverage of NPDN support.
- NPDN funding has enabled the leveraging of additional support of over \$5 million in extramurally funded research and extension grants in various multistate crop biosecurity projects in Hawaii alone.

How the NPDN adds value to help state and federal agencies address programmatic goals:

- NPDN has contributed to the early detection of exotic pests in the U.S., as evident through reporting of new continental, state, and county records.
- NPDN's triage system of diagnostic laboratories alleviates pressure on APHIS laboratories, which do not have the capacity to process the surge encountered during serious outbreaks, thus reducing the number of suspect samples submitted to federal laboratories by over 75% during such events.
- NPDN has contributed to the professional development of diagnosticians at state departments of agriculture by providing support to enable them to attend training workshops and scientific meetings.
- NPDN training and education programs have leveraged an average national program coordination investment of \$100,000 per annum to generate approximately \$1,500,000 in additional funds from multiple funding sources to develop innovative extension educational materials to deliver information on invasives, plant health, and biosecurity. Additionally, the First Detector program has been leveraged to generate additional state-based support for extension-related invasive species programs in many cases.
- NPDN epidemiology program has leveraged an investment of \$500,000 to generate over \$3,000,000 in grants from industry, local, state and federal programs to develop tools for the analysis of outbreaks.
- NPDN is a valuable resource that helps support research projects throughout the country by providing disease and pest information through the National Repository, validating new diagnostic protocols, and coordinating outreach and education on selected pest and disease agents.