NPDN
NATIONAL PLANT DIAGNOSTIC NETWORK

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Authorized by the Food and Agriculture Defense Initiative (FADI)

NARETPA of 1977, 7 U.S.C. 3318 Sect 1477 and Homeland Security NARETPA, 7 U.S.C 3351 Sect 1484.

MISSION

The NPDN is the premier diagnostic system, protecting the American food system by quickly detecting and accurately identifying plant pests and pathogens and communicating timely and accurate information through the appropriate channels.

FUNCTION

The NPDN enlists the partnership of over 70 diagnostic labs in 50 states and four territories (Puerto Rico, US Virgin Islands, Guam, and American Samoa). The labs serve a diverse clientele on a wide array of plant health issues. NPDN protects national plant health by quickly detecting and accurately identifying plant pests and pathogens and effectively communicating these diagnoses to stakeholders and clientele. When pathogens or pests of concern are found, NPDN laboratories report their findings to appropriate responders and decision-makers to facilitate quick responses that better protect the health of our plant systems. The network, comprised of highly skilled diagnosticians, employs a full array of advanced diagnostic technologies to meet the needs of clientele in each state and territory and to serve partners in plant protection better. To achieve this vision, NPDN strives to provide the resources necessary to enhance the capability and capacity of diagnosticians and plant diagnostic labs nationwide.

So What?

NPDN labs are critical for first-level recognition of new plant pest introductions, serving a triage function for USDA-APHIS-Plant Protection and Quarantine (PPQ) to delimit invasions and coordinating with Regional Pest Management Centers and state pest management programs (RIPMC and Extension

CUSTOMERS AND COLLABORATORS

Clientele

Growers/producers, nursery and ornamental industry, Master Gardeners, homeowners, and others with plant production or protection responsibilities

Stakeholders

USDA-NIFA, Land-grant extension systems

Partners

USDA-APHIS, state departments of agriculture, USDA-ARS, IPM, research and industry members in diagnostics, detection, epidemiology, and disease management

Members

Diagnostic professionals, mostly at land-grant university plant diagnostic laboratories

State Integrated Pest Management Programs

Many states work closely with state IPM programs on monitoring programs to identify unknown or suspicious plant pests and diseases and provide training to clients on the best response to those threats.

Regional Integrated Pest Management Centers

Regional IPM Center staff are the interface between labs and the USDA Office of Pest management Programs and EPA in developing workable responses to plant pest and disease threats.

Implementation Program-EIP) to increase public awareness and implementation of control measures.

ACCOMPLISHMENTS

The Food and Ag Defense programs were established in response to recognizing vulnerabilities that were exposed on 9-11. Those threats are no less prevalent today. Trade and travel around the globe increases the potential for plant pest and disease introductions. When those introductions have occurred, NPDN has been there to respond and assist state and federal authorities in the recognition and response. Some examples include:

» Pest Invasions and introductions:

- Tomato Brown Rugose Fruit Virus (*Tomato brown rugose fruit virus* – ToBRFV) – A new disease of tomatoes and peppers first identified globally in 2014 has occurred in limited production areas of the U.S. but can be a trade issue if infected fruit is detected in the country. The virus persists in the environment and can cause devastating losses from unexpected sources.

- Sudden Oak Death (*Phytophthora ramorum*) – First identified in the mid-1990s in California, SOD can infect over 100 different plant species in natural settings and the landscape. The costs to the nursery industry in keeping the pathogen out of their stock are enormous. It has resulted in several trace-forward actions to determine where potentially infected plants may have been shipped. NPDN labs have been critical to these activities.

- Southern Bacterial Wilt (*Ralstonia solanacearum* r3 b2) – Three incidents have occurred since the start of the network involving the importation of infected geranium cuttings from Kenya and Guatemala. While the pathogen has occurred in the U.S. already, the more aggressive and temperature tolerant r3, b2 form does not; it can cause more brown rot of potato and tomato wilt diseases. NPDN tested thousands of triage samples in support of APHIS-PPQ to respond quickly, limiting the spread of the pathogen and eradicate any introductions.

- Boxwood Blight (*Calonectria pseudonaviculata*) – Likely an introduction from Asia, Boxwood blight is now found in at least 30 states, decimating ornamental plantings valued at tens of thousands of dollars. NPDN provided early recognition of the disease and data on the range of

AUTHORIZATION AND FUNDING

Base funding is provided through the Food and Agriculture Defense Initiative in the Farm Bill, a NIFA competitive grant, Land-grant Extension, APHIS-PPQ through the suggestion process, other federal grants, some state departments of agriculture (state funding), and some clinic fees (varying by state laws).

Overall Total Funding
$4-5 Million annually
NIFA Funding: $3 Million

NIFA Indirect cost recovery rate: 10%

Other sources
Variable. Often depending on crisis situations and may only be available to select labs.

A diagnostician sorts some of the hundreds of samples that may be submitted to a lab during the peak season for crop diseases.

its occurrence. Labs shared recommendations for effective treatment to reduce disease spread.

» Emerging, reemerging, and endemic disease threats – existing pests and diseases are important too and can become more widespread or aggressive in a changing climate, such as beech leaf disease, the wheat rust disease complex, black dot of potato, and many others.

Specific case study

Michigan carrot and celery producers rely on services from the Michigan State University IPM Program (NIFA-CPPM-EIP) and MSU Plant & Pest Diagnostic Lab (NIFA-FADI-NPDN) to detect the leafhoppers carrying the aster yellows phytoplasma, a plant pathogenic bacterium that causes a disease called aster yellows. Infected carrots and celery are not marketable due to a bitter flavor. The cost of the sampling and testing is covered by the carrot and celery commodity groups, as well as EIP and NPDN funding from NIFA. If the lab detects a high enough proportion of the leafhoppers that carry the pathogen, the producers will spray an insecticide. If the number is lower than a treatment threshold, the producers can skip a spray and save money. These programs provide coordinated services that are not available from any other source. By collaborating, these programs make a difference for producers in managing their input costs and profitability.

IMPACTS

Impact is difficult to define in that success is measured by minimized losses. The Southern Plant Diagnostic Region has calculated that conservatively, more than $7.2M has been saved through their services to commercial clients alone.

CHALLENGES

» Unstable funding puts the entire agricultural industry of food, feed, fiber, forestry, and ornamentals at risk.

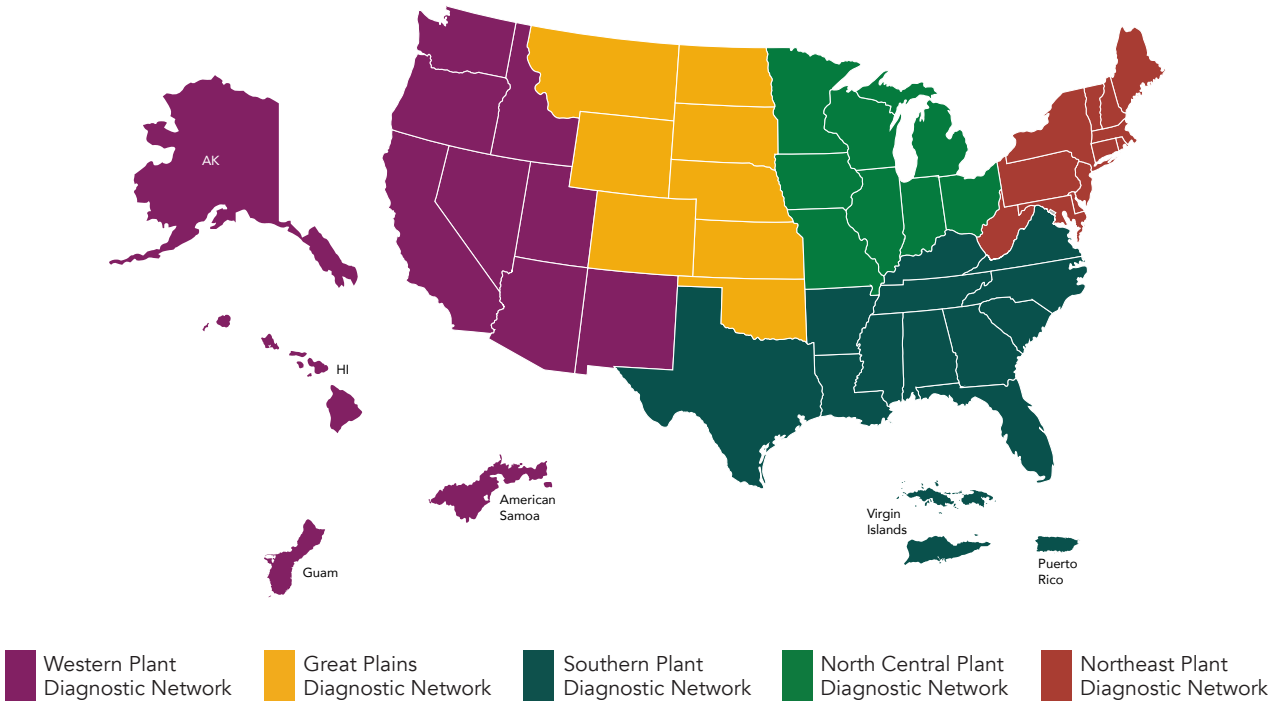
» Now more than ever, there is a generational changeover of mature experienced scientists retiring and young scientists stepping into those vacant positions. Training is important, and an initiative is in place to train the next generation if funding can be sustained.

» Data storage is an expensive and expansive effort, yet critical to understanding long-term trends in pest and disease distribution.

Aster yellows symptoms on carrot foliage. Credit: Whitney Cranshaw, Colorado State University; Bugwood.org

A diagnostician examines a fungal culture from a diseased plant.

National Plant Diagnostic Network



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