

### **Program Overview**

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The [Plant Pathology program](#) at the [Nevada Department of Agriculture](#) (NDA) has expanded and evolved to include laboratory-based pathogen testing, microorganism and nematode identification, STAR-D accredited clinical diagnosis of plant health problems, and new disease research, in addition to exotic plant disease surveys, crop health certification, disease quarantine and regulations, and public outreach and assistance. It is a science-based program to help Nevada citizens and industries achieve their goals in plant health through integrated approaches of exclusion, early detection, eradication, surveillance and management of plant diseases and disorders.

### **Exotic disease diagnostics and survey**

The Plant Pathology program conducts statewide surveys for exotic plant diseases and nematodes before they become established in the state and cause extensive damage to agricultural crops and other resources. Early detection of exotic plant diseases and nematodes helps to prevent economic losses that could result from widespread plant diseases and/or the cost of mitigation. Survey data support and promote the export of Nevada grown commodities to international markets. Annual surveys of cyst nematodes on potato crops helped facilitate the opening of a Japanese market for Nevada grown potatoes.



### **Quarantine disease detection and monitoring**

The program oversees annual monitoring and detection of state quarantined plant pathogens such as *Allium* white rot fungus, stem and bulb nematode, mint wilt, late blight, and lethal yellowing of palms. Early detection of these pathogens helps prevent their spread in agricultural fields or urban environments. All allium crops (onion and garlic) grown in Nevada are inspected annually during the growing season to map the occurrence of the white rot disease. Infected fields will be quarantined and treated to protect allium crop production areas in Nevada.



### **Nursery disease diagnostics and inspection**

Nursery stock movement is one of the most significant pathways for the spread of regulated and non-regulated plant diseases into the state. The Plant Pathology Laboratory (PPL) supports statewide nursery inspection and enforcement programs by providing timely lab testing, diagnosis and recommendations for disease eradication. The Plant Pathology program also inspects nursery plants for regulated diseases when nurseries receive plants from quarantine zones or under a trace forward order. This lab-backed inspection program has ensured clean nursery stock for consumers and businesses in Nevada.



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#### Crop disease diagnostics and seed certification

The Plant Pathology program in conjunction with the NDA's Seed Certification program performs seed crop health certification and phytosanitary inspections to promote health and value of crop commodities produced in Nevada. The PPL supports annual seed crop inspection and certification by providing diagnostic testing services. Major seed crops include alfalfa, triticale, wheat, potatoes, and industrial hemp. Testing data are used to determine crop eligibility for seed production based on allowable disease tolerance and the eligibility of commodities for export to foreign countries according to the phytosanitary requirements of importing countries. Testing for the presence of genetically modified organisms (GMO) is also provided as needed.



#### Urban forestry and ornamental plant diagnostics

Nevada has diverse ornamental plants and landscape trees. The PPL accepts plant samples from Nevada residents and tests samples for diseases and disorders. Management recommendations are provided to clients based on the problem diagnosed. Timely and correct diagnosis of problems associated with Nevada urban plants is beneficial for all Nevada citizens who need assistance in plant disease or problem diagnosis, and it leads to effective remedies and a reduction of unnecessary pesticide use.



#### Regulatory diagnostics and NPPLAP certification

The NDA PPL uses USDA-CPHST diagnostic protocols and participated in the National Plant Protection Laboratory Accreditation Program (NPPLAP). Lab staff are trained in performing molecular diagnostic testing and certified to perform molecular tests for *Phytophthora ramorum*, the pathogen of sudden oak death, and *Candidatus Liberibacter spp.*, the pathogen of Citrus Greening, also known as Huanglongbing.



#### Research on new disease outbreaks

Plant disease outbreaks often occur when a pathogen is first introduced and environmental conditions favor the disease development. The lab is usually called by farmers who request assistance to investigate the cause and nature of an outbreak. Lab members work effectively to test for and confirm the causal agent using microscopic, serological, and molecular approaches. Suggested management approaches are then prescribed to mitigate the damage.



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#### **NPDN STAR-D accredited plant clinical services**

The laboratory functions as a statewide plant diagnostic center to meet Nevada's plant health needs. The lab implemented the National Plant Diagnostic Network (NPDN) quality management system to ensure a timely, accurate, and reliable diagnosis. Its clientele includes commercial farmers, organic and small producers, nurseries, landscape professionals, pesticide applicators, extension agents, master gardeners, arborists, and homeowners. An annual online survey from clients is conducted to ensure the lab is providing satisfactory services.



#### **Public outreach and first detector training**

We serve the public including commercial farmers, organic and small producers. Onsite visits and field diagnostics are provided when a disease outbreak occurs. We distribute plant health information to the public through workshops, lectures, and diagnostic services. Hundreds of green industry professionals have been trained as NPDN first detectors to watch for new pests and diseases.



#### **Partnership with Nevada System of Higher Education**

The Plant Pathology program has been a resource for the University of Nevada faculty, USDA Agricultural Research Services and Desert Research Institute researchers who conduct scientific research or develop new products for controlling plant disease. The plant pathologist gives lectures to undergraduate students. The PPL accepts both college and high school students for its internship program to provide work experience in plant pathology and laboratory procedures.

