

Report of the Plant Diagnostic Laboratory At North Dakota State University

January 1 through December 31, 2007

Available on-line at <http://www.ag.ndsu.nodak.edu/diaglab/reports.htm>

Compiled by Kasia Kinzer, Plant Diagnostician
NDSU Department of Plant Pathology

NDSU College of Agriculture, Food
Systems, and Natural Resources
NORTH DAKOTA STATE UNIVERSITY
NDSU Extension Service

Report of the Plant Diagnostic Laboratory at North Dakota State University

October 1, 2005 through December 31, 2006

Table of Contents

LAB PERSONNEL AND OTHER INFORMATION	3
NATIONAL PLANT DIAGNOSTIC NETWORK	3
ACTIVITIES OF THE NDSU PLANT DIAGNOSTIC LAB	3
2007 – THE YEAR IN REVIEW:	4
GOALS FOR 2008.....	5
NDSU PLANT DIAGNOSTIC LAB FEES*	6
NDSU SEED HEALTH TESTING FEES*	6
FEE WAIVERS FOR EXTENSION PERSONNEL	7
<i>A Guide for Estimating Turn-Around Time</i>	<i>7</i>
LAB STATISTICS	8
TOTAL SAMPLES RECEIVED BY YEAR, 1990 THROUGH 2007	8
MONTHLY SAMPLE SUBMISSION 2007	8
NUMBER OF SAMPLES BY LOCATION 2007	9
NUMBER OF SAMPLES RECEIVED BY SAMPLE CATEGORY 2007	10
NUMBER OF SAMPLES FROM NORTH DAKOTA BY SAMPLE CATEGORY 2007	11
OUT-OF-STATE SAMPLES BY CATEGORY 2007	12
NUMBER OF DIAGNOSES BY SAMPLE CATEGORY AND DIAGNOSIS CATEGORY 2007	13
DUTCH ELM DISEASE – BY ND COUNTY 2004-2007	14
<i>Dutch Elm Disease Samples by County</i>	<i>14</i>
SEED HEALTH SAMPLES 2007.....	15
DETAILS OF DIAGNOSTIC SAMPLES PROCESSED IN 2007	16
SPECIALISTS CONSULTED IN 2007	27

Lab Personnel and Other Information

Kasia Kinzer (MS, Plant Pathology) is the plant diagnostician, Montgomery 'Monty' Botschner (BS, Biotechnology) is the lab technician, and Aimee Thapa (BS, Horticulture) is the summer assistant for the NDSU Plant Diagnostic Lab.

National Plant Diagnostic Network

NDSU Plant Diagnostic Lab is a member of the Great Plains Diagnostic Network (GPDN), a region of the National Plant Diagnostic Network (NPDN). The National Plant Diagnostic Network was established in partnership with the Cooperative State Research, Education, and Extension Service (CSREES). It focuses on the plant disease and pest aspects of the Animal & Plant Disease and Pest Surveillance & Detection Network. The NPDN is a collective of Land Grant University plant disease and pest diagnostic facilities from across the United States. The NPDN was formed in 2002 to enhance the ability of plant pest diagnosticians around the country to more quickly diagnose potential biological threats to agriculture. These threats to agriculture or urban landscapes may be intentionally or accidentally introduced. A network of registered NPDN First Detectors is continually expanding, to enhance early detection of unusual plant problems. First Detectors learn how to collect and package samples, and where to send them. Suspicious samples are submitted to an NPDN diagnostic lab for verification. A communication plan is in place to deal with verification of organisms that are considered to be high consequence.

The NPDN encourages plant diagnostic labs at land grant universities around the country to use a secure, on-line database that is administered from a central location. This database is known as the Plant Disease Identification System (PDIS). The NDSU Plant Diagnostic Lab has been using this database since May 2006.

One advantage of the PDIS database is that sample information can be digitally submitted by registered users (such as extension agents and state specialists) to the NDSU Plant Diagnostic Lab, and digital images can be uploaded to the database from remote sites. For public access, a public digital image library, subject to peer review, is also available to browse (sample images are not automatically available to view in this public library). The NDSU Plant Diagnostic Lab will continue to provide training and support to Extension agents and staff who want to submit and track samples using this secure, user-friendly database.

Activities of the NDSU Plant Diagnostic Lab

- Provide cost-effective diagnostic services to agricultural producers, the horticulture industry, homeowners, and individuals
- Maintain USDA-accreditation for testing for potato bacterial ring rot in seed potatoes (obtained in Spring 2005) for North Dakota seed certification and to satisfy Canadian export requirements
- Provide limited seed health-related testing services for growers, certain phytosanitary and survey testing services for the North Dakota Department of Agriculture, and special testing services for research personnel
- Teach the labs of Introductory Plant Pathology each Fall semester
- Support the Master Gardener program and other horticultural training programs
- Support the agricultural industry by offering seminars and training as requested
- Continue to fulfill requirements to be in compliance with the 2002 Bioterrorism Act

2007 – The Year in Review:

1. Support of county extension personnel continued, and attempts to improve this support by decreasing turn-around time and increasing accuracy of diagnoses for samples submitted are on-going:
 - Diagnostic sample turn-around time in 2004: 10.2 days
 - Diagnostic sample turn-around time in 2005: 9.4 days
 - Diagnostic sample turn-around time in 2006: 8.9 days
 - Diagnostic sample turn-around time in 2007: 10.3 days (increased turnaround time is attributed to increased number of samples requiring culturing in 2007)
2. Professional development in 2007:
 - Nematode Workshop (sponsored by GPDN, hosted by KSU), Fall 2007
 - Mycotoxin Workshop (sponsored by GPDN, hosted by MSU), Fall 2007
3. Application of real-time PCR technology for diagnostic tests, when applicable and available:
 - Continued screening for *Clavibacter michagensis* subsp. *sepedonicus* using real-time PCR (Mills et al. primers)
 - If required, can unofficially detect the soybean rust pathogen using a protocol developed and published by USDA scientists
4. Support of National Plant Diagnostic Network by implementing PDIS and training submitters on usage of the PDIS database, and by continuing to coordinate training for First Detectors:
 - PDIS is the database and billing software used by the Lab.
 - Nine additional first detectors were trained in 2007, during two separate web conferencing events, bringing the total number of First Detectors in North Dakota to 63. First Detector training will continue in 2008, to strive toward an ultimate goal of at least 150 First Detectors in North Dakota.
5. Increased awareness about special services that the Plant Diagnostic Lab can offer:
 - Sample numbers continue to rise in the Research, Seed Health, and Phytosanitary categories, compared to 2006.
 - In 2008, we are scheduled to formally participate in at least 2 research projects (pending funding) to provide diagnostic support for principal investigators at NDSU
6. Calendar year annual reports (rather than by fiscal year).
 - This annual report is the first to reflect data from actual calendar year 2007, rather than a fiscal year (e.g. October 1, 2006 through September 30, 2007).
7. Improved teaching support and Lecturer for Introductory Plant Pathology laboratory sections
 - Four lab sections of Introductory Plant Pathology were offered in Fall 2007. A graduate student teaching assistant was responsible for the fourth lab section.
 - Lab manual was revised to include formal lab exercises, to be completed for credit
 - A guide for teaching assistants and the lab lecturer was prepared, to detail sources of materials for, protocols for preparation and execution of, and time lines for laboratory exercises.

Goals for 2008

- Diagnostic training for the NDSU plant diagnostician and technician will be offered through USDA and the GPDN. Two of these workshops, Potato Cyst Nematode Identification, and Ralstonia Identification, will be offered in Beltsville, Maryland in February and March, 2008. Kasia Kinzer is scheduled to attend both of these identification training workshops.
- First Detector training events will continue to be offered for county agents and other agricultural professionals who desire to become registered first detectors in the National Plant Diagnostic Network.
- First Detector Educator training events may begin in 2008 to enable county agents to offer First Detector training to members of their respective counties.
- Interested county extension agents and staff will continue to receive training on how to use PDIS to submit sample information and digital images.
- The use of conventional PCR and real-time PCR to supplement diagnosis of additional organisms, when applicable, is expected to rise in 2008. In particular, use of PCR for potato virus characterization is scheduled to be implemented by Spring 2009.
- We will continue to strive to improve the accuracy and speed of diagnosis while remaining cost-effective.
- Weekly reports are scheduled to be made available on-line during the summer months only. Annual reports are also available on-line. See <http://www.ag.ndsu.nodak.edu/diaglab/>
- Improved instruction for Introductory Plant Pathology labs in fall 2008
 - improved overall readability of lab manual, with extra information clearly indicated
 - improved relevance of lab exercises
 - inclusion of more fresh material

NDSU Plant Diagnostic Lab Fees*

- Routine diagnosis (includes routine culture, when required)
 - ND Resident \$15
 - Out of State \$25
- Non-routine culture – Routine diagnosis fee + \$10 \$25
- ELISA (serological test for certain viruses, fungi, or bacteria) \$25
(\$10 for each additional sample, same organism)
- Dutch elm disease test \$30
- Herbicide injury evaluation (visual only) \$15
- Plant or insect identification \$15
- Home mold identification \$15
- Nematode tests (SCN, others) \$25
- Soil Bioassays \$110 minimum
 - Rhizomania (BNYVV)
 - Root rot index (Aphanomyces, others)
- IFA for ash yellows phytoplasma (for research samples only) \$30
- Potato tuber rot evaluation \$35
- PCR (gene-based analysis) – price varies depending on cost and availability of primers; usually about \$30 per sample; discounts may apply for bulk submissions

NDSU Seed Health Testing Fees*

- Canola*
- Blackleg of Canola assay (2-3 lb. minimum sample) \$50
- Dry Edible Beans*
- "Dome Test" for Bacterial Blight pathogens (3-5 lb. minimum sample) \$50
 - Anthracnose testing (3-5 lb. minimum sample) \$50
 - "Dome" + Anthracnose (5-8 lb minimum sample) \$90
- Potato*
- Late Blight tuber screen (min. 400 tubers) \$75
 - Bacterial Ring Rot of Potatoes for Export (minimum 400 tubers required; ELISA/IFA, positives verified with real-time PCR) \$150
 - Virus testing on tuber sprouts (min. 600 tubers) 1st Virus: \$342
(\$25 each additional virus)
 - Potato tissue culture 6-virus/1-bacteria screen (PVA, PVM, PVS, PVX, PVY, PLRV, and *Clavibacter michiganensis* subsp. *sepedonicus*; *Erwinia atroseptica*/syn: *Pectobacterium atrosepticum* by request) \$10/per plantlet
 - PSTV (available by special arrangement; call for pricing) varies
- Pulse crops - Lentils / Chickpeas (Garbanzos) / Field Peas*
- Ascochyta screening (3-5 lb. minimum sample) pea/lentil: \$65
chickpea: \$95
 - Anthracnose screening (2-3 lb. minimum sample) \$50
 - Nematode seed wash \$25
- Small Grains*
- Black Point screen (2-3 lb. minimum sample) \$50
 - Bunt seed wash (per ISTA method; submitted sample: min. 1000 grams; sub-sample: min. 50 grams) \$75
- Sunflower*
- Nematode seed wash \$25

Special tests not listed above may be available by arrangement. Contact the lab at 701.231.7854 or email: kasia.kinzer@ndsu.edu.

* The fees listed here are valid through December 31, 2008.

Fee Waivers for Extension Personnel

Samples referred (or submitted) to the lab by extension personnel can qualify for a fee waiver. Each county extension office and Research and Extension Center receives four fee waivers annually. These waivers can be used to waive the following fees: routine diagnosis, culture, Dutch elm disease test, herbicide injury evaluation (visual only; NDSU no longer offers chemical residue analysis on a routine basis), plant/insect identification, home mold identification, nematode test, or routine virus test. **Note:** The fee waiver cannot be applied to seed health testing, the potato spindle tuber viroid test, and certain other special tests. If you have any questions, please contact the lab.

Fee waiver coupons for 2008 will be available during the Spring Extension Conference in Bismarck, North Dakota, in packets prepared by the NDSU Plant Diagnostic Lab for Counties and Research Extension Centers (those not picked up at the conference will be mailed). Please prepare ND residents for the \$15 fee if they are referred to the Plant Diagnostic Lab without a fee waiver.

A Guide for Estimating Turn-Around Time

Many of the samples that come into the lab have uncommon or unusual symptoms that are not routinely encountered by experts. As a result, more time is spent on these samples in attempts to determine the cause of the symptoms. Culturing is typically required to help determine or confirm the possible cause(s) of symptoms observed. Extensive culturing increases the turn-around time for results, and sometimes the cause of symptoms remains inconclusive even after considerable effort.

Estimated turnaround times for samples:

Sample Type	Estimated turnaround time
Field Crops	1-7 days
Tree/Shrub	5-7 days
ELISA testing	1-4 days
PCR testing	1-7 days
Culturing	2-4 weeks
Nematode	1-7 days
Fruits/Vegetables	1-14 days
Ornamentals	1-14 days
Turf/Lawn	1-14 days
Plant/Insect ID	1-7 days
Mold ID	2 weeks
Seed Health	24 hours to several weeks
Phytosanitary	24 hours to several weeks

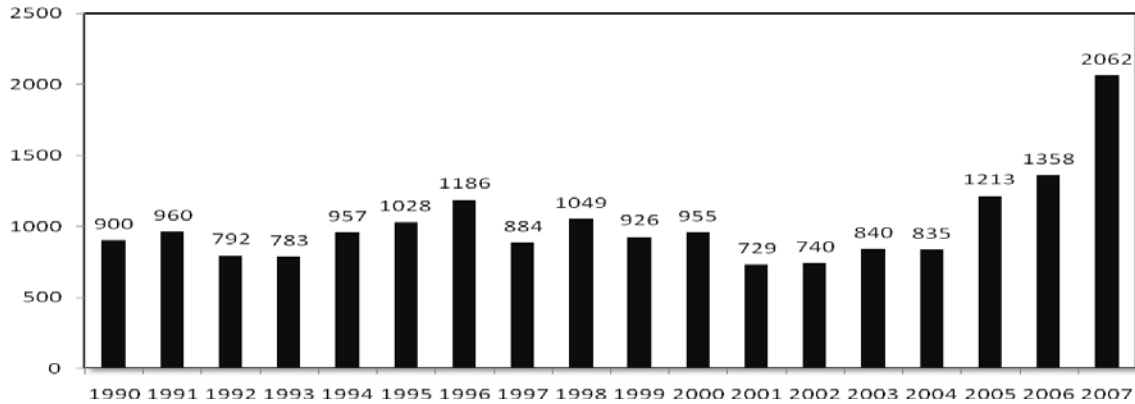
These are just guidelines and they are based on one sample. If multiple samples are received from the same submitter, these estimates would need to be adjusted accordingly. Actual turnaround time depends on several factors, such as number of samples; availability of expert consultants; knowledge of the crop; type of problem suspected; priority (triage; e.g. samples that require immediate corrective actions vs. samples with no such immediate need); and so on. The lab generally adopts a 'first-come-first-served' policy, but under certain circumstances, some samples, particularly commercial ones or those suspected to be infected by a 'high risk' pest (as defined by the National Plant Diagnostic Network), may be given priority, especially if a very narrow window of time for treatment exists.

Lab Statistics

Total samples Received by Year, 1990 through 2007

A historical perspective of samples received by the lab is presented in the graph below. The 18-year average is 1010 samples per year. Total sample number received per year has been on the rise for the past three years. This trend is primarily due to an increase in a phytosanitary test to screen for specific nematodes in pea and other pulse crops destined for India.

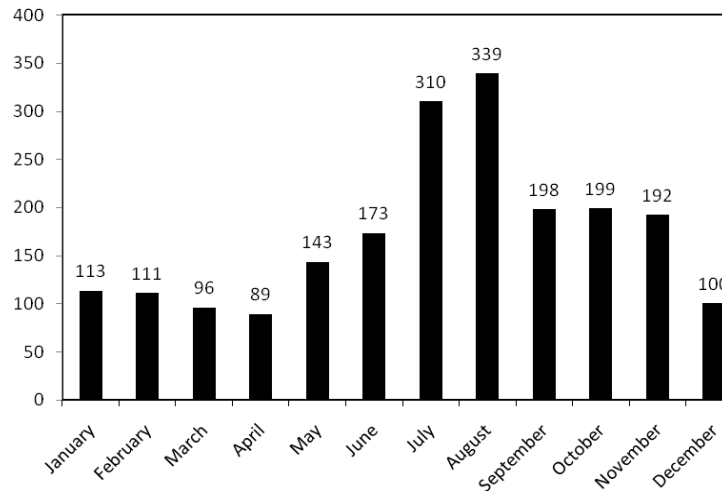
**Annual Number of Samples Received by the
NDSU Plant Diagnostic Lab
1990-2007**



Monthly Sample Submission 2007

Monthly submission rates of samples to the Plant Diagnostic Lab vary by time of year. Plant diagnostic services comprise the bulk of the samples submitted during the summer months, and the fees are kept low to encourage use of the lab. Seed health testing, phytosanitary testing services, and research samples dominate during the winter months.

**Number of Samples Submitted by
Month, 2007**



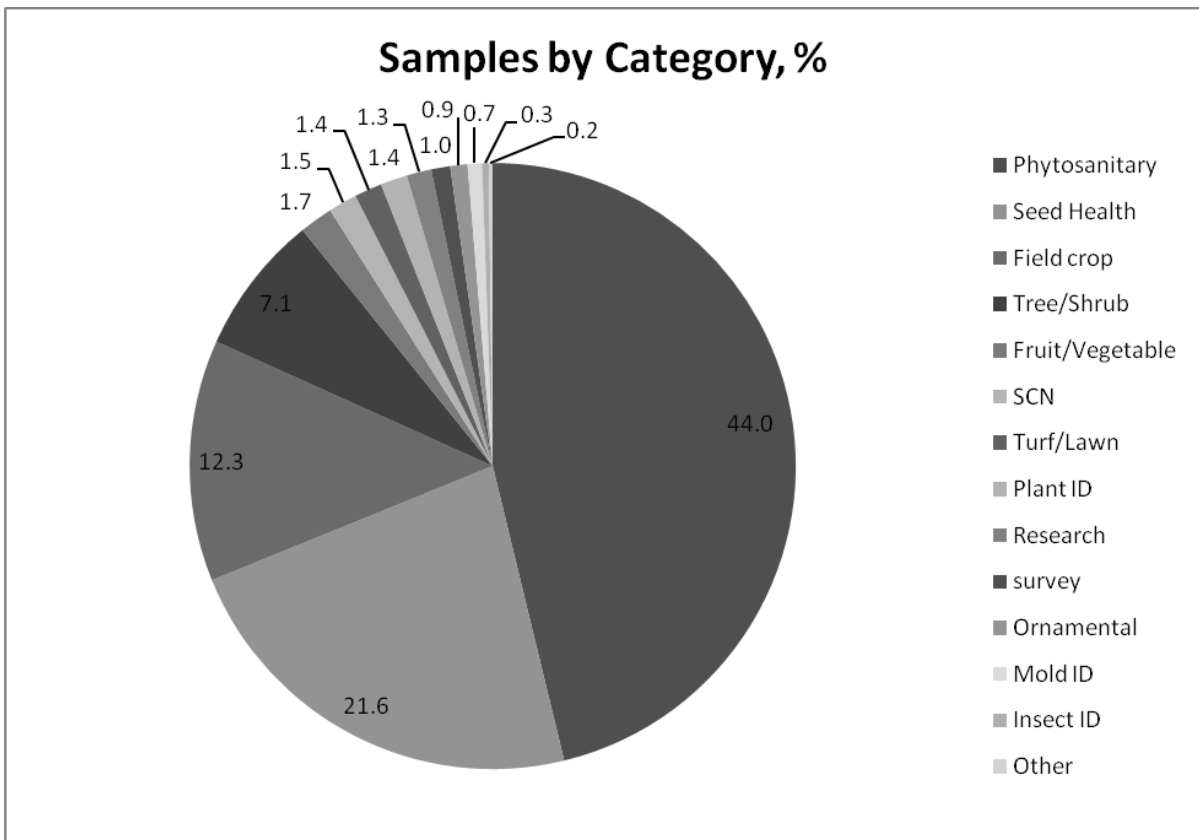
Number of Samples by location 2007

Samples received by location		
State or Country	County	# samples
North Dakota	Not Reported	22
North Dakota	Adams	18
North Dakota	Barnes	7
North Dakota	Benson	1
North Dakota	Bottineau	18
North Dakota	Bowman	30
North Dakota	Burke	24
North Dakota	Burleigh	470
North Dakota	Cass	179
North Dakota	Cavalier	17
North Dakota	Dickey	6
North Dakota	Divide	27
North Dakota	Dunn	1
North Dakota	Eddy	3
North Dakota	Emmons	15
North Dakota	Foster	11
North Dakota	Golden Valley	6
North Dakota	Grand Forks	23
North Dakota	Grant	0
North Dakota	Griggs	4
North Dakota	Hettinger	6
North Dakota	Kidder	17
North Dakota	Lamoure	7
North Dakota	Logan	1
North Dakota	McHenry	5
North Dakota	McIntosh	5
North Dakota	McKenzie	3
North Dakota	McLean	85
North Dakota	Mercer	1
North Dakota	Morton	5
North Dakota	Mountrail	21
North Dakota	Nelson	4
North Dakota	Oliver	1
North Dakota	Pembina	16
North Dakota	Pierce	1
North Dakota	Ramsey	10
North Dakota	Ransom	12
North Dakota	Renville	8
North Dakota	Richland	30
North Dakota	Rolette	0
North Dakota	Sargent	5
North Dakota	Sheridan	1
North Dakota	Sioux	0

North Dakota	Slope	1
North Dakota	Starke-Billings	15
North Dakota	Steele	9
North Dakota	Stutsman	53
North Dakota	Towner	3
North Dakota	Traill	15
North Dakota	Walsh	15
North Dakota	Ward	70
North Dakota	Wells	4
North Dakota	Williams	46
California	NA	6
Colorado	NA	61
Iowa	NA	1
Idaho	NA	2
Illinois	NA	2
Kansas	NA	1
Michigan	NA	43
Minnesota	Not Reported	21
Minnesota	Becker	4
Minnesota	Clay	39
Minnesota	Hubbard	52
Minnesota	Kittson	1
Minnesota	Mahnomen	12
Minnesota	Marshall	3
Minnesota	Morrison	3
Minnesota	Norman	1
Minnesota	Otter Tail	6
Minnesota	Pennington	3
Minnesota	Polk	11
Minnesota	Ramsey	1
Minnesota	Stearns	3
Minnesota	Swift	1
Minnesota	Todd	16
Minnesota	Traverse	2
Minnesota	Wilkin	3
Minnesota	Yellow Medicine	1
Montana	NA	13
Nebraska	NA	110
Oregon	NA	33
Pennsylvania	NA	1
South Dakota	NA	14
Texas	NA	2
Wisconsin	NA	29
Canada	NA	20

Number of Samples Received By Sample Category 2007

A total of 2,062 samples were submitted in 2007. Samples submitted for phytosanitary testing formed the largest category, with 903 of phytosanitary submissions specifically for a nematode seed test on pulse crops destined for India. The actual number of seed health samples has also increased, compared to prior years when the number of seed health samples was 364 (2006), 301 (2005), and 217 (2004). The number of field samples (253 received in 2007, 281 in 2006, 382 in 2005, and 392 in 2004) fluctuates from year to year, likely due to variation in disease pressure from year to year. The Trees and Shrubs category consistently makes up a significant portion of sample submissions. In 2007, the tree/shrub category makes up 7.1% of all samples; if phytosanitary and seed health samples are omitted from the total, 24% of diagnostic samples submitted to the lab are tree/shrub samples.



Number of Samples from North Dakota by Sample Category 2007

County	Sample Category								
	Field Crop	Tree or Shrub	Lawn	Orna-mental	Fruit or Vegetable	Plant ID	Insect ID	Mold ID	Soil or Nema-tode
Adams	6	0	0	0	0	0	1	0	1
Barnes	13	1	0	0	0	0	0	0	0
Benson	0	1	0	0	0	0	0	0	0
Bottineau	6	0	0	0	0	0	0	0	0
Bowman	3	2	0	0	2	0	0	0	0
Burke	0	0	0	0	0	0	0	0	0
Burleigh	3	12	0	0	1	2	0	1	1
Cass	53	41	17	4	15	5	1	9	12
Cavalier	13	0	0	1	0	5	0	0	0
Dickey	2	1	0	2	2	1	0	0	0
Divide	4	0	0	0	0	0	0	0	0
Dunn	0	0	0	0	0	0	0	0	0
Eddy	0	0	0	0	0	0	0	0	0
Emmons	3	7	2	0	0	1	0	0	0
Foster	7	0	0	0	1	0	0	0	0
Golden Valley	3	2	1	0	0	1	0	0	0
Grand Forks	8	5	1	1	0	2	0	0	0
Grant	0	0	0	0	0	0	0	0	0
Griggs	4	0	0	0	0	1	0	0	0
Hettinger	3	0	0	1	1	2	0	0	0
Kidder	13	5	0	0	0	0	0	0	0
Lamoure	3	2	0	0	3	0	0	0	0
Logan	0	2	0	0	0	0	0	0	0
McHenry	6	4	0	0	0	0	0	0	0
McIntosh	5	2	0	0	0	0	0	0	0
McKenzie	2	1	0	0	0	0	0	0	0
McLean	4	0	3	0	0	4	0	0	0
Mercer	0	0	0	0	0	0	0	0	0
Morton	2	1	0	0	1	1	0	0	0
Mountrail	1	0	1	0	0	0	0	0	0
Nelson	0	0	0	0	0	0	0	0	0
Oliver	2	0	0	0	0	0	0	0	0
Pembina	18	4	0	0	1	0	0	0	0
Pierce	1	0	0	0	0	0	0	0	0
Ramsey	0	2	1	0	0	2	0	1	0
Ransom	13	4	0	0	1	0	0	0	0
Renville	3	6	0	0	0	0	0	0	0
Richland	21	2	2	0	2	0	0	0	15
Rolette	0	2	0	0	0	0	0	0	0
Sargent	1	2	0	0	0	0	0	1	0
Sheridan	0	0	0	0	0	0	1	0	0
Sioux	0	0	0	0	0	0	0	0	0
Slope	0	2	0	0	0	0	0	0	0
Starke-Billings	7	3	1	1	1	3	1	0	0
Steele	9	1	0	0	1	0	0	0	0
Stutsman	5	1	0	0	0	4	0	0	0
Towner	0	0	0	0	0	0	0	0	0
Traill	15	4	0	0	0	1	0	0	0
Walsh	8	2	0	0	0	1	1	0	0
Ward	14	1	0	1	2	0	1	0	0
Wells	2	4	0	0	1	0	0	0	0
Williams	2	0	0	0	0	0	0	0	0

Out-of-State Samples by Category 2007

State	Sample Category								
	Field Crop	Tree or Shrub	Lawn	Orna-mental	Fruit or Vegetable	Plant ID	Insect ID	Mold ID	Soil/Ne matode
Colorado	2	0	0	0	0	0	0	0	0
Illinois	2	0	0	0	0	0	0	0	0
Kansas	0	0	1	0	0	0	0	0	0
Minnesota	100	18	6	1	4	6	0	2	1
Montana	3	0	0	0	0	0	0	0	0
Pennsylvania	0	0	0	0	1	0	0	0	0
South Dakota	13	1	0	1	0	0	0	0	0
Texas	1	0	0	0	0	0	0	1	0
Not Recorded	1	1	0	0	0	0	0	0	0

**Number of Diagnoses by Sample Category and Diagnosis Category
2007**

Sample Category	Diagnosis Category									
	Total Diagnoses	Fungi	Bacteria	Viruses	Arthropods	Nematodes	Herbicide Injury	Abiotic	Poor /Insufficient	Unknown
Field Crops	410	186	25	30	11	1	63	70	7	17
Tree/Shrub	150	35	1	0	38	0	10	59	5	2
Fruit/Veg	40	13	3	0	5	0	1	14	3	1
Plant ID	46	0	0	0	0	0	0	0	0	0
Insect ID	6	0	0	0	0	0	0	0	0	0
Mold/Fungi ID	16	0	0	0	0	0	0	0	0	0
Turf/Lawn	32	15	0	0	0	0	0	16	0	1
Ornamental	12	3	0	1	2	0	0	4	1	1
Survey	42	21	0	21	0	0	0	0	0	0
Soil	30	0	0	0	0	29	0	1	0	0
Total Diagnoses	784	273	29	52	56	30	74	164	16	22

Dutch Elm Disease – By ND County 2004-2007

Dutch elm disease continues to infect American elm trees throughout the state. Although Dutch elm disease testing data from the lab is presented here, these data cannot indicate whether incidence has risen or lowered from one year to the next since not all samples suspected to be infected with Dutch elm disease are sent here for testing. Symptoms of Dutch elm disease are fairly diagnostic by experienced tree health professionals, but only a laboratory test can confirm the presence of the Dutch elm disease pathogen.

Keeping American elm trees healthy is the best defense against infection. Adequate watering and fertilization is important, but just as important, and possibly even more critical, are the following recommendations, offered by Dr. James Walla (NDSU research pathologist): 1) avoid application of broadleaf herbicides that contain dicamba near the rootzone of the trees; 2) avoid any other herbicide damage to the leaves or roots of the trees; and 3) avoid mechanical damage to the trunk or roots of the trees (mowers and weed whackers can cause serious problems). These measures, however, only reduce the possibility of infection; they don't eliminate the possibility completely.

Fungicide injections may also be helpful to protect a tree against infection, but such treatments are costly and must be repeated every couple of years. Consequently, fungicide injections are usually only economically justified for trees of high value. Such injections are primarily a protective measure, before a tree becomes infected. Some fungicides, however, may be able to eradicate the disease if the infection has not progressed very far. In such cases, the tree reportedly has a better chance of survival if the fungicide injection is combined with proper pruning to remove infected limbs. These 'curative' treatments can also negatively affect the tree (phytotoxicity). Good luck is also involved, since such treatments are not always effective and it is not yet apparently fully understood why.

Some American elm cultivars and several elm hybrids have demonstrated tolerance or even possible resistance to Dutch elm disease. Homeowners should talk to their county agent or to NDSU extension specialists to find which cultivars, hybrids, or varieties of elm have performed well in ND.

Dutch Elm Disease Samples by County

County, Number submitted	2004		2005		2006		2007	
	Positive	Not Detected	Positive	Not Detected	Positive	Not Detected	Positive	Not Detected
Benson	0	1	--	--	--	--	--	--
Cass	2	0	1	2	3	0	1	1
Eddy	2	0	0	2	--	--	--	--
LaMoure	--	--	--	--	1	0	1	0
McKenzie	--	--	--	--	2	0	--	--
McIntosh	--	--	1	0	--	--	--	--
Ottertail	--	--	--	--	0	1	--	--
Sargent	0	1	0	2	--	--	--	--
Ward	--	--	--	--	0	1	--	--
Wells	3	0	--	--	--	--	--	--
Total:	7	2	2	6	6	2	2	1

Seed health samples 2007

Samples for seed health testing are usually submitted during the winter months, typically beginning in September. The number of samples submitted for potato bacterial ring rot (BRR), potato viruses, nematode seed wash (screening for nematodes on seed of pulse crops and sunflower), dome (bacterial foliar blights on dry bean), anthracnose, and other seed health tests are summarized in the table below.

Seed health testing and Phytosanitary summary 2007	
Test Type	Number of samples submitted for requested test
BRR	195
Potato viruses	49
Nematode – pulse crops and sunflower	908
Dome (bacterial, dry bean)	NA
Anthracnose (dry bean, pulse crops)	NA
Ascochyta (pulse crops)	NA
Other	NA

NA = not available

Details of Diagnostic Samples Processed in 2007

The table below summarizes the diagnoses by the NDSU Plant Diagnostic Lab, by plant type or sample category. Research samples are not included in the table below.

Field Crops				
Host	Diagnosis	Taxonomic Name	Confidence	Number of Samples
Alfalfa	Alfalfa Weevil	<i>Hypera postica</i>	Confirmed	1
Alfalfa	Chemical Injury	Abiotic disorder	Suspected	1
Alfalfa	Spring Black Stem; Leaf Spot	<i>Phoma medicaginis</i>	Confirmed	1
Barley	Black Point	<i>Alternaria</i> ; <i>Helminthosporium</i>	Confirmed	1
Barley	BYDV-PAV	Barley Yellow Dwarf Virus, Strain 2	Confirmed	1
Barley	Chemical Injury	Abiotic disorder	Suspected	1
Barley	Chemical; Environmental Injury	Abiotic disorder	Suspected	1
Barley	Common root rot	<i>Bipolaris sorokiniana</i>	Confirmed	1
Barley	Fusarium Blight	<i>Fusarium graminearum</i>	Confirmed	1
Barley	Fusarium Root Rot	<i>Fusarium sp./spp.</i>	Confirmed	1
Barley	Fusarium Root Rot	<i>Fusarium sp./spp.</i>	Inconclusive	1
Barley	Nutrient Imbalance	Abiotic disorder	Suspected	1
Barley	Nutritional Deficiency	Abiotic disorder	Suspected	2
Barley	WSMV	Wheat Streak Mosaic Virus	Confirmed	1
Corn	Acetochlor Injury	Abiotic disorder	Suspected	1
Corn	Chemical Injury	Abiotic disorder	Suspected	2
Corn	Chemical; Environmental Injury	Abiotic disorder	Suspected	1
Corn	Cold Wet Soils	Abiotic disorder	Confirmed	1
Corn	Cultural/Environmental Problem	Abiotic disorder	Suspected	1
Corn	Dicamba Injury	Abiotic disorder	Suspected	1
Corn	Environmental Stress; Problem	Abiotic disorder	Suspected	1
Corn	Fusarium Stalk Rot	<i>Fusarium moniliforme</i>	Confirmed	1
Corn	Gibberella Stalk Rot	<i>Fusarium graminearum</i>	Confirmed	1
Corn	Glyphosate Injury	Abiotic disorder	Suspected	2
Corn	Physiological Responses	Abiotic disorder	Suspected	1
Corn	Planting Too Shallow	Abiotic disorder	Suspected	1
Corn	Poor or Insufficient Sample	Insufficient sample	Inconclusive	1
Corn	Wireworms (Click Beetles)	Family Elateridae	Confirmed	1
Crested Wheatgrass	Slime Mold	Class myxomycetes	Confirmed	1
Dry Bean	Bacterial Brown Spot	<i>Pseudomonas syringae</i> pv. <i>syringae</i>	Suspected	1
Dry Bean	Bacterial Leaf Spot	Uncharacterized bacteria	Suspected	2
Dry Bean	Chemical Injury	Abiotic disorder	Suspected	1
Dry Bean	Chemical; Environmental Injury	Abiotic disorder	Suspected	1
Dry Bean	Common Bacterial Blight	<i>Xanthomonas campestris</i> pv. <i>phaseoli</i>	Suspected	2
Dry Bean	Frost injury	Abiotic disorder	Suspected	1
Dry Bean	Growth Regulator Effect	Abiotic disorder	Suspected	1
Dry Bean	Iron Deficiency	Abiotic disorder	Suspected	1
Dry Bean	No Pathogen Found	No-pathogen-found	Inconclusive	1

Dry Bean	Not Pathogen; Saprophyte	Saprophytes	Confirmed	1
Dry Bean	Poor or Insufficient Sample		Confirmed	1
Dry Bean	Rhizoctonia Root Rot	Rhizoctonia sp./spp.	Confirmed	2
Dry Bean	Unknown Abiotic Disorder	Abiotic disorder	Suspected	2
Dry bean	Wind Damage	Abiotic disorder	Suspected	1
Dry Bean - Kidney	Chemical Injury	Abiotic disorder	Suspected	1
Dry Bean - Kidney	Environmental Stress; Problem	Abiotic disorder	Suspected	2
Dry Bean - Navy	Chemical Injury	Abiotic disorder	Suspected	1
Dry Bean - Navy	Common Bacterial Blight	Xanthomonas campestris pv. phaseoli	Suspected	1
Dry Bean - Navy	Herbicide Injury; Exposure	Abiotic disorder	Suspected	1
Flax	Glyphosate Injury	Abiotic disorder	Suspected	3
Oat	BYDV-PAV	Barley Yellow Dwarf Virus, Strain 2	Confirmed	1
Onion	Purple Blotch	Alternaria porri	Confirmed	1
Onion	Unknown	General	Inconclusive	1
Pea, field/dry	Ascochyta Blight	Ascochyta sp./spp.	Confirmed	7
Pea, field/dry	Bacterial Leaf Spot	Uncharacterized bacteria	Suspected	1
Pea, field/dry	Fusarium Root Rot	Fusarium sp./spp.	Confirmed	5
Pea, field/dry	Inconclusive Sample	Undetermined	Inconclusive	1
Pea, field/dry	Pea Bacterial Blight	Pseudomonas syringea pv. pisi	Confirmed	1
Pea, field/dry	Pythium Root Rot	Pythium sp./spp.	Suspected	2
Pea, field/dry	Rhizoctonia Root Rot	Rhizoctonia sp./spp.	Confirmed	3
Potato	Bacterial Soft Rot	Erwinia sp./spp.	Confirmed	5
Potato	Black Scurf	Rhizoctonia solani	Confirmed	4
Potato	Common scab	Streptomyces scabies	Confirmed	2
Potato	Cultural/Environmental Problem	Abiotic disorder	Suspected	1
Potato	Environmental Stress; Problem	Abiotic disorder	Suspected	1
Potato	Fusarium Dry Rot	Fusarium sp./spp.	Suspected	3
Potato	Fusarium Dry Rot	Fusarium sp./spp.	Confirmed	2
Potato	Leak	Pythium debaryanum	Suspected	2
Potato	Physiological Responses	Abiotic disorder	Suspected	3
Potato	Pink rot	Phytophthora erythroseptica	Suspected	5
Potato	Poor or Insufficient Sample	Insufficient sample	Confirmed	1
Potato	Potassium Deficiency	Abiotic disorder	Suspected	1
Potato	Potato Black Leg	Pectobacterium atrosepticum/Erwinia spp.	Suspected	1
Potato	Silver Scurf	Helminthosporium solani	Confirmed	1
Potato	various tuber rots		Confirmed	13
Quinoa	Anthracoese	Colletotrichum sp./spp.	Suspected	1
Rape; Canola	Alternaria Leaf Spot	Alternaria sp./spp.	Confirmed	1
Rape; Canola	Aster Yellows	Phytoplasma	Suspected	1
Rape; Canola	Black Leg	Phoma sp./spp.	Confirmed	3
Rape; Canola	Black Spot	Alternaria sp./spp.	Confirmed	1
Rape; Canola	Chemical Injury	Abiotic disorder	Suspected	2
Rape; Canola	Fusarium Root Rot	Fusarium sp./spp.	Confirmed	1
Rape; Canola	Herbicide Drift	Abiotic disorder	Suspected	2
Rape; Canola	Inconclusive Sample	Undetermined	Inconclusive	1
Rape; Canola	Insect Damage	Abiotic disorder	Suspected	1
Rape; Canola	Mechanical Damage	Abiotic disorder	Suspected	1
Rape; Canola	Poor or Insufficient Sample	Identification Analysis	Confirmed	1

Rape; Canola	Rhizoctonia Root Rot	Rhizoctonia sp./spp.	Confirmed	1
Rape; Canola	Unknown Abiotic Disorder	Abiotic disorder	Confirmed	2
Soybean	Australasian Soybean Rust	Phakopsora pachyrhizi	Not Detected	40
Soybean	BPMV	Bean Pod Mottle Virus	Not Detected	1
Soybean	Charcoal Rot	Macrophomina phaseolina	Confirmed	3
Soybean	Chemical Injury	Abiotic disorder	Suspected	3
Soybean	Chemical; Environmental Injury	Abiotic disorder	Suspected	2
Soybean	Environmental Stress; Problem	Abiotic disorder	Suspected	1
Soybean	Flower Thrips	Frankliniella tritici	Suspected	1
Soybean	Fusarium Root Rot	Fusarium oxysporum	Confirmed	1
Soybean	Fusarium Root Rot	Fusarium sp./spp.	Suspected	5
Soybean	Genetic Disorder	Abiotic disorder	Suspected	1
Soybean	Glyphosate Injury	Abiotic disorder	Inconclusive	1
Soybean	Growth Regulator Effect	Abiotic disorder	Suspected	16
Soybean	Hail Damage	Abiotic disorder	Suspected	1
Soybean	Herbicide Injury; Exposure	Abiotic disorder	Suspected	1
Soybean	Iron Deficiency	Abiotic disorder	Suspected	2
Soybean	Mechanical Damage	Abiotic disorder	Suspected	2
Soybean	New World Soybean Rust	Phakopsora meibomiaae	Not Detected	40
Soybean	Nitrogen Deficiency	Abiotic disorder	Suspected	1
Soybean	No Pathogen Found	No-pathogen-found	Confirmed	1
Soybean	Poor or Insufficient Sample	Identification Analysis	Confirmed	1
Soybean	Root Rot	Unidentified fungus	Suspected	3
Soybean	SMV	Soybean mosaic virus	Not Detected	1
Soybean	Soybean Anthracnose	Colletotrichum graminicola	Confirmed	1
Soybean	Soybean Bacterial Blight	Pseudomonas savastanoi pv. glycinea	Suspected	2
Soybean	Soybean Cyst Nematode (SCN)	Heterodera glycines	Confirmed	1
Soybean	Soybean Pod and Stem Blight	Diaporthe phaseolorum	Suspected	1
Soybean	Soybean Pod and Stem Blight	Diaporthe phaseolorum	Confirmed	1
Soybean	Unknown Abiotic Disorder	Abiotic disorder	Suspected	1
Soybean	Wind Damage	Abiotic disorder	Suspected	1
Sugar Beet	Cercospora leaf spot	Cercospora beticola	Suspected	1
Sugar Beet	Chemical Injury	Abiotic disorder	Suspected	1
Sugar Beet	Dicamba Injury	Abiotic disorder	Suspected	1
Sugar Beet	Fusarium Dry Rot	Fusarium sp./spp.	Confirmed	1
Sugar Beet	Fusarium Root Rot	Fusarium sp./spp.	Inconclusive	2
Sugar Beet	Fusarium Yellows	Fusarium oxysporum	Confirmed	2
Sugar Beet	Glyphosate Injury	Abiotic disorder	Suspected	4
Sugar Beet	Growth Regulator Effect	Abiotic disorder	Suspected	1
Sugar Beet	Herbicide Drift	Abiotic disorder	Suspected	1
Sugar Beet	Inconclusive Sample	Undetermined	Inconclusive	1
Sugar Beet	No Pathogen Found	No-pathogen-found	Confirmed	1
Sugar Beet	Rhizoctonia Crown and Root Rot	Rhizoctonia sp./spp.	Confirmed	1
Sugar Beet	Rhizoctonia Root Rot	Rhizoctonia sp./spp.	Confirmed	2
Sugar Beet	Rhizomania, BNYYV	Beet Necrotic Yellow Vein Virus	Not Detected	2
Sugar Beet	Striped Slantfaced Grasshopper	Amphitornus coloradus	Suspected	1
Sugar Beet	Unknown	General	Inconclusive	2
Sugar Beet	Weevils	Family Curculionidae	Inconclusive	1

Sunflower	Chemical Injury	Abiotic disorder	Suspected	4
Sunflower	Chemical; Environmental Injury	Abiotic disorder	Suspected	2
Sunflower	Growth Regulator Effect	Abiotic disorder	Suspected	5
Sunflower	Minute Pirate Bugs	Family Anthocoridae	Confirmed	1
Sunflower	Sunflower Downy Mildew	Plasmopara halstedii	Confirmed	1
Sunflower	Sunflower Rust	Puccinia helianthi	Confirmed	1
Sunflower	Unknown	General	Inconclusive	1
Sunflower	Unknown Abiotic Disorder	Abiotic disorder	Suspected	1
Wheat - Durum	BYDV	Barley Yellow Dwarf Virus	Not Detected	1
Wheat - Durum	Cold Wet Soils	Abiotic disorder	Suspected	1
Wheat - Durum	Environmental Stress; Problem	Abiotic disorder	Suspected	2
Wheat - Durum	Growth Regulator Effect	Abiotic disorder	Inconclusive	1
Wheat - Durum	High Temperature Damage	Abiotic disorder	Suspected	1
Wheat - Durum	HPV	High Plains Virus	Confirmed	1
Wheat - Durum	Inconclusive Sample	Inconclusive	Inconclusive	1
Wheat - Durum	Late planting date	Cultural problem	Suspected	1
Wheat - Durum	Low Soil Moisture	Abiotic disorder	Suspected	1
Wheat - Durum	Nutritional Deficiency	Abiotic disorder	Suspected	1
Wheat - Durum	Pythium Root Rot	Pythium sp./spp.	Confirmed	1
Wheat - Durum	WSMV	Wheat Streak Mosaic Virus	Confirmed	1
Wheat - not specified	Aphids	Family Aphididae	Confirmed	1
Wheat - not specified	Bacterial Stripe; Black Chaff	Xanthomonas campestris pv. translucens	Suspected	5
Wheat - not specified	BYDV-PAV	Barley Yellow Dwarf Virus, Strain 2	Confirmed	3
Wheat - not specified	BYDV-RPV	Barley Yellow Dwarf Virus, Strain 6	Suspected	3
Wheat - not specified	Common root rot	Bipolaris sorokiniana	Confirmed	2
Wheat - not specified	Drought Stress Damage	Abiotic disorder	Suspected	1
Wheat - not specified	Growth Regulator Effect	Abiotic disorder	Suspected	3
Wheat - not specified	Herbicide Injury; Exposure	Abiotic disorder	Suspected	1
Wheat - not specified	High Temperature Damage	Abiotic disorder	Suspected	2
Wheat - not specified	Inconclusive Sample	Undetermined	Inconclusive	1
Wheat - not specified	Loose Smut (Wheat; Rye)	Ustilago tritici	Confirmed	1
Wheat - not specified	Nitrogen Deficiency	Abiotic disorder	Suspected	2
Wheat - not specified	No Pathogen Found	No-pathogen-found	Confirmed	2
Wheat - not specified	Nutritional Deficiency	Abiotic disorder	Suspected	2
Wheat - not specified	Phosphorus Deficiency	Abiotic disorder	Suspected	1
Wheat - not specified	Poor or Insufficient Sample	Identification Analysis	Confirmed	1
Wheat - not specified	Root Rot	Unidentified fungus	Suspected	1
Wheat - not specified	Tan Spot	Pyrenophora tritici-repentis	Suspected	1
Wheat - not specified	Unknown Abiotic Disorder	Abiotic disorder	Suspected	3
Wheat - not specified	Wheat Stem Maggot	Meromyza americana	Suspected	2
Wheat - not specified	Wind Damage	Abiotic disorder	Suspected	1
Wheat - not specified	WSMV	Wheat Streak Mosaic Virus	Confirmed	2
Wheat - Spring	Cultural/Environmental Problem	Abiotic disorder	Suspected	1
Wheat - Spring	Genetic Disorder	Abiotic disorder	Suspected	1
Wheat - Spring	High Temperature Damage	Abiotic disorder	Suspected	1
Wheat - Spring	HPV	High Plains Virus	Confirmed	2
Wheat - Spring	Insect Damage	Abiotic disorder	Suspected	1
Wheat - Spring	Moisture Stress	Abiotic disorder	Suspected	1

Wheat - Spring	Nutritional Deficiency	Abiotic disorder	Suspected	1
Wheat - Spring	Pythium Root Rot	Pythium sp./spp.	Suspected	1
Wheat - Spring	Septoria Leaf Blotch	Septoria	Suspected	1
Wheat - Spring	Unknown	General	Inconclusive	1
Wheat - Spring	Unknown Abiotic Disorder	Abiotic disorder	Suspected	1
Wheat - Spring	WSMV	Wheat Streak Mosaic Virus	Confirmed	3
Wheat - winter	Bacterial Stripe; Black Chaff	Xanthomonas campestris pv. translucens	Suspected	1
Wheat - winter	BYDV-PAV	Barley Yellow Dwarf Virus, Strain 2	Confirmed	1
Wheat - winter	High Temperature Damage	Abiotic disorder	Suspected	1
Wheat - winter	HPV	High Plains Virus	Inconclusive	1
Wheat - winter	HPV	High Plains Virus	Confirmed	1
Wheat - winter	Nutrient Imbalance	Abiotic disorder	Suspected	1
Wheat - winter	Poor or Insufficient Sample	Identification Analysis	Confirmed	1
Wheat - winter	Slime Mold	Class myxomycetes	Confirmed	1
Wheat - winter	Take-all	Gaeumannomyces graminis var. tritici	Suspected	1
Wheat - winter	Tan Spot	Pyrenophora tritici-repentis	Suspected	2
Wheat - winter	Unknown	General	Inconclusive	1
Wheat - winter	Unknown Abiotic Disorder	Abiotic disorder	Suspected	1
Wheat - winter	WSMV	Wheat Streak Mosaic Virus	Confirmed	4

Fruit/Vegetable

Host	Diagnosis	Taxonomic Name	Confidence	Number of Samples
Apple	Apple Black Rot	Physalospora obtusa/sphaeropsis	Suspected	3
Apple	Black Rot	Botryosphaeria obtusa	Suspected	1
Apple	Cultural/Environmental Problem	Abiotic disorder	Suspected	1
Apple	European Fruit Lecanium	Parthenolecanium corni	Suspected	1
Apple	Lecanium Scales	Lecanium sp./spp.	Confirmed	1
Apple	Nutritional Deficiency	Abiotic disorder	Suspected	1
Apple	Poor or Insufficient Sample	Insufficient sample	Inconclusive	1
Apple	Unknown Abiotic Disorder	Abiotic disorder	Inconclusive	1
Apple	Unknown Abiotic Disorder	Abiotic disorder	Suspected	1
Apricot	Poor or Insufficient Sample	Identification Analysis	Confirmed	1
Apricot	Root Rot	Unidentified fungus	Suspected	1
Choke Cherry	Black Knot	Apiosporina morbosa	Confirmed	1
Choke Cherry	Cherry Leaf Spot; Shothole	Coccomyces sp./spp.	Suspected	1
Choke Cherry	Scorch	Abiotic disorder	Suspected	1
Cucumber	Mechanical Damage	Abiotic disorder	Suspected	1
Cucumber	Nutritional Deficiency	Abiotic disorder	Suspected	1
Garden Beet	Rhizoctonia Root Rot	Rhizoctonia sp./spp.	Confirmed	1
Grape	Black Rot	Guignardia bidwellii	Confirmed	1
Grape	Grapevine Tomato Gall Midge	Lasioptera vitis	Suspected	1
Plum	Oedema; Edema	Abiotic disorder	Suspected	1
Plum	Plum Pockets	Taphrina sp./spp.	Confirmed	1
Potato	Growth Regulator Effect	Abiotic disorder	Suspected	1
Raspberry	Fungal leaf spot (general)		Confirmed	1
Raspberry	Insect Damage	Abiotic disorder	Suspected	1
Raspberry	Iron Deficiency	Abiotic disorder	Suspected	1
Raspberry	Poor pollination	Abiotic disorder	Inconclusive	1

Tomato	Anthrachnose	Colletotrichum coccodes	Confirmed	2
Tomato	Bacterial Speck	Pseudomonas syringae pv. tomato	Inconclusive	1
Tomato	Copper Toxicity	Abiotic disorder	Suspected	1
Tomato	Fusarium Wilt	Fusarium oxysporum	Confirmed	1
Tomato	Insect Damage	Abiotic disorder	Suspected	1
Tomato	Nitrogen Deficiency	Abiotic disorder	Confirmed	1
Tomato	Physiological Responses	Abiotic disorder	Suspected	1
Tomato	Poor or Insufficient Sample	Identification Analysis	Confirmed	1
Tomato	Sulfur Deficiency	Abiotic disorder	Suspected	1
Tomato	Unknown	General	Inconclusive	1
Fungus ID Requests				
Host/Habitat	Diagnosis	Taxonomic Name	Confidence	Number of Samples
Fungus Id request	Artist's Conk (Shell Disease)	Ganoderma applanatum	Confirmed	1
Fungus Id request	Black mold	Stachybotrys chartarum	Confirmed	1
Fungus Id request	Inky Caps	Coprinus sp./spp.	Suspected	1
Household	Mold	Ulocladium sp./spp.	Confirmed	2
Household	Mold	Unidentified Mold	Confirmed	7
Household	Mold	Unidentified Mold	Not Detected	2
Household	Spadicoides-like mold		Suspected	1
Insect ID Requests				
Host/Habitat	Diagnosis	Taxonomic Name	Confidence	Number of Samples
Flax	Indianmeal Moth (Imm)	Plodia interpunctella	Confirmed	1
Household	Formicid Ant	Formica sp./spp.	Confirmed	1
Insect Id request	Millipedes	Arthropoda; diplopoda	Confirmed	1
Insect Id request	Mottled Tortoise Beetle	Deloyala guttata	Confirmed	1
Insect Id request	Tortoise Beetle	Cassida circumdata	Confirmed	1
Leafy spurge	Tortricid Leafrollers	Family Tortricidae	Confirmed	1
Ornamentals				
Host	Diagnosis	Taxonomic Name	Confidence	Number of Samples
Daylily	Unknown Abiotic Disorder	Abiotic disorder	Suspected	1
Ivy	Unknown	General	Inconclusive	1
Peony	Iron Deficiency	Abiotic disorder	Suspected	1
Petunias	Botrytis Blight	Botrytis cinerea	Suspected	1
Petunias	Root Rot	Unidentified fungus	Confirmed	1
Petunias	Unspecified Viral Disease	Unspecified Viral Disease	Suspected	1
Rose	Bristly Roseslug	Cladius difformis	Confirmed	1
Rose	Gall Wasps	Family Cynipidae	Confirmed	1
Rose	Rose Rust	Phragmidium spp.	Confirmed	1
Rose	Winter Injury	Abiotic disorder	Suspected	1
Rubber Plant	Poor or Insufficient Sample	Insufficient sample	Confirmed	1
Virginia Creeper	Oedema; Edema	Abiotic disorder	Suspected	1
Host not specified	Unknown	General	Inconclusive	1

Other Hosts				
Host	Diagnosis	Taxonomic Name	Confidence	Number of Samples
Multiple plant hosts	Growth Regulator Effect	Abiotic disorder	Suspected	1
Multiple plant hosts	Poor or Insufficient Sample	Insufficient sample	Confirmed	1
Periwinkle	Bacterial pathogen - general	Identification Analysis	Suspected	1
Seaside Arrowgrass	Pest Undetermined	General	Confirmed	1
Plant ID Requests				
Host/Habitat	Diagnosis	Taxonomic Name	Confidence	Number of Samples
Alfalfa	Thistle; Russian	Salsola iberica	Confirmed	1
Home and garden	American elder	Sambucus canadensis	Confirmed	1
Pasture	Sheep Fescue	Festuca ovina	Suspected	1
Plant Id request	Alyssum; Hoary False	Berteroa incana	Suspected	1
Plant Id request	Alyssum; Hoary False	Berteroa incana	Confirmed	1
Plant Id request	Bentgrass; Marsh	Agrostis stolonifera	Confirmed	1
Plant Id request	Cheatgrass (Brome; Downy)	Bromus tectorum	Suspected	3
Plant Id request	Common Buckthorn	Rhamnus cathartica	Confirmed	1
Plant Id request	Devil's Darning Needles	Clematis virginiana	Suspected	1
Plant Id request	Flixweed	Descurainia sophia	Confirmed	1
Plant Id request	Lambsquarters; Common	Chenopodium album	Confirmed	3
Plant Id request	Nightshade; Bittersweet	Solanum dulcamara	Confirmed	1
Plant Id request	Norway Maple	Acer platanoides	Suspected	1
Plant Id request	Oriental Bittersweet	Celastrus orbiculatus	Suspected	1
Plant Id request	Other	General	Suspected	7
Plant Id request	Perennial Ryegrass	Lolium perenne	Confirmed	1
Plant Id request	Poison Ivy	Toxicodendron (rhus)	Confirmed	1
Plant Id request	Poor or Insufficient Sample	Identification Analysis	Confirmed	1
Plant Id request	Redroot Pigweed	Amaranthus retroflexus	Suspected	2
Plant Id request	Riverbank Grape	Vitis riparia	Suspected	1
Plant Id request	Rough Cinquefoil	Potentilla norvegica	Confirmed	1
Plant Id request	Sage; Lanceleaf	Salvia reflexa	Suspected	2
Plant Id request	Sedges	Family Cyperaceae	Confirmed	1
Plant Id request	Small Leaved Pussytoes	Antennaria parvifolia	Confirmed	1
Plant Id request	Sumpweed; Povertyweed	Iva axillaris	Suspected	1
Plant Id request	Sunflower; Maximilian	Helianthus maximilianii	Confirmed	1
Plant Id request	Tall Goldenrod	Solidago canadensis	Confirmed	1
Plant Id request	Timothy	Phleum pratense	Confirmed	1
Plant Id request	Toadflax; Yellow	Linaria vulgaris	Confirmed	1
Plant Id request	Unknown	General	Inconclusive	1
Plant Id request	Violets	Family Violaceae	Suspected	1
Plant Id request	Virgin's Bower	Clematis sp./spp.	Confirmed	1
Plant Id request	Western Virgin's Bower	Clematis ligusticifolia	Suspected	1
Plant Id request	Yews	Family Taxaceae	Suspected	1
Soil Samples				

Host	Diagnosis	Taxonomic Name	Confidence	Number of Samples
SCN sample	Soybean Cyst Nematode (SCN)	Heterodera glycines	Confirmed	9
SCN sample	Soybean Cyst Nematode (SCN)	Heterodera glycines	Not Detected	18
clogged drain tile	iron ochre	Abiotic disorder	Suspected	1
Trees/Shrubs				
Host	Diagnosis	Taxonomic Name	Confidence	Number of Samples
Arborvitae	Environmental Stress; Problem	Abiotic disorder	Suspected	1
Ash	Ash bark beetles	Hylesinus sp.	Suspected	1
Ash	Cytospora Canker	Cytospora sp./spp.	Confirmed	1
Ash	Environmental Stress; Problem	Abiotic disorder	Suspected	1
Ash	Excessive Water	Abiotic disorder	Suspected	1
Ash	Mechanical Damage	Abiotic disorder	Suspected	1
Ash	Root Damage	Abiotic disorder	Suspected	1
Ash – green	Aphids	Family Aphididae	Confirmed	1
Ash – green	Ash anthracnose	Gloeosporium aridum	Suspected	1
Ash – green	Ash Flower Gall Mite	Eriophyes fraxiniflora	Confirmed	1
Aspen – Quaking	Azalea Bark Scale	Eriococcus azaleae	Confirmed	1
Aspen - Quaking	Inconclusive Sample	Undetermined	Inconclusive	1
Aspen - Quaking	Scurfy Scale	Chionaspis furfura	Suspected	1
Barberry	Excessive Water	Abiotic disorder	Suspected	1
Basswood; Linden	Drought Stress Damage	Abiotic disorder	Suspected	1
Basswood; Linden	Gall Mites	Family Eriophyidae	Suspected	1
Basswood; Linden	Scorch	Abiotic disorder	Suspected	2
Birch	Bacterial wetwood	Various bacteria	Suspected	1
Boxelder	Growth Regulator Effect	Abiotic disorder	Suspected	1
Buckey, Ohio	Leaf Blotch (Horsechestnut)	Guignardia aesculi	Confirmed	1
Catalpa	Fungal leaf spot (general)	Unidentified fungus	Inconclusive	1
Cedar	Kabatina Tip Blight	Kabatina juniperi	Suspected	1
Crabapple	Apple Scab	Venturia inaequalis	Confirmed	3
Crabapple	Wood rot; coal fungus	Daldinia concentrica	Confirmed	1
Crabapple	Earthworms	Annelida; oligochaeta	Confirmed	1
Crabapple	Pesticide Toxicity	Abiotic disorder	Suspected	1
Crabapple	Root Suckers	Abiotic disorder	Confirmed	1
Currant - Alpine	Scorch	Abiotic disorder	Suspected	1
Dogwood	Environmental Stress; Problem	Abiotic disorder	Suspected	1
Dogwood	Mechanical Damage	Abiotic disorder	Confirmed	1
Elm	Dutch Elm Disease	Ophiostoma ulmi	Confirmed	3
Elm - American	Dutch Elm Disease	Ophiostoma ulmi	Not Detected	1
Hackberry	Glyphosate Injury	Abiotic disorder	Suspected	1
Juniper	Scale Insects	Order homoptera	Confirmed	1
Lilac	Aphids	Family Aphididae	Confirmed	1
Lilac	Excessive Water	Abiotic disorder	Suspected	2
Lilac	Poor or Insufficient Sample		Confirmed	1
Lilac	Root Rot	Unidentified fungus	Suspected	1

Lilac - Japanese	Scale Insects	Order homoptera	Confirmed	1
Maple	Cottony Maple Scale	Pulvinaria innumerabilis	Confirmed	2
Maple	Eutypella Canker	Eutypella parasitica	Suspected	1
Maple	Maple Bladdergall Mite	Vasates quadripedes	Confirmed	1
Maple	Poor or Insufficient Sample		Confirmed	1
Maple	Scorch	Abiotic disorder	Confirmed	1
Maple	Silver Maple Erineum Mite	Eriophyes aceris	Confirmed	1
Maple - Japanese	Eriophyid Mites	Family Eriophyidae	Confirmed	1
Maple - Silver	Eriophyid Mites	Family Eriophyidae	Confirmed	1
Maple - Silver	Iron Deficiency	Abiotic disorder	Suspected	2
Multiple hosts	Apple Scab	Venturia inaequalis	Confirmed	1
Multiple hosts	Canker	Unidentified fungus	Confirmed	1
Multiple hosts	Canker	Unidentified fungus	Suspected	1
Multiple hosts	Dicamba Injury	Abiotic disorder	Suspected	1
Multiple hosts	Fungal leaf spot (general)	Unidentified fungus	Suspected	1
Multiple hosts	Growth Regulator Effect	Abiotic disorder	Suspected	1
Multiple hosts	Lecanium Scales	Lecanium sp./spp.	Confirmed	1
Multiple hosts	Mechanical Damage	Abiotic disorder	Confirmed	1
Multiple hosts	Mechanical Damage	Abiotic disorder	Suspected	1
Multiple hosts	Oak Leaf Blister	Taphrina caerulescens	Confirmed	1
Multiple hosts	Unknown Abiotic Disorder	Abiotic disorder	Suspected	1
Not specified	Septoria Leaf Spot	Septoria sp./spp.	Inconclusive	1
Oak, Bur	Environmental Stress; Problem	Abiotic disorder	Suspected	1
Oak, Bur	Gall Wasps	Family Cynipidae	Confirmed	1
Oak, Bur	Oak Anthracnose	Gnomonia quercina	Suspected	2
Oak, Bur	Oak Bullet Gall Wasp	Disholcaspis globulus	Confirmed	1
Oak, Bur	Oak Leaf Blister	Taphrina caerulescens	Suspected	1
Oak, Bur	Tatters	Abiotic disorder	Suspected	1
Oak, Bur	Unidentified fungus	Unidentified fungus	Confirmed	1
Oak, Bur	Wood Boring Insect Damage		Confirmed	1
Pear - Harbin	Environmental Stress; Problem	Abiotic disorder	Suspected	1
Pine	Environmental Stress; Problem	Abiotic disorder	Suspected	2
Pine	Pine Needle Scale	Chionaspis pinifoliae	Confirmed	1
Pine - Ponderosa	Large Pine Aphid	Cinara pinea	Suspected	1
Poplar	Wood Boring Insect Damage		Confirmed	1
Privet	Iron Deficiency	Abiotic disorder	Suspected	1
Privet	Lace Bugs	Family Tingidae	Confirmed	11
Serviceberry	Entomosporium Leaf Spot	Entomosporium sp./spp.	Confirmed	1
Serviceberry	Poor Root Development	Abiotic disorder	Suspected	1
Serviceberry	Pythium Root Rot	Pythium sp./spp.	Suspected	1
Spruce - Black Hills	Environmental Stress; Problem	Abiotic disorder	Suspected	2
Spruce - Blue	Chemical Injury	Abiotic disorder	Inconclusive	1
Spruce - Blue	Cytospora Canker	Cytospora sp./spp.	Suspected	2
Spruce - Blue	Environmental Stress; Problem	Abiotic disorder	Suspected	3
Spruce - Blue	Insufficient Light	Abiotic disorder	Suspected	1
Spruce - Blue	Poor or Insufficient Sample	insufficient sample	Suspected	1
Spruce - Blue	Rhizosphaera Needle Cast	Rhizosphaera kalkhoffi	Confirmed	1
Spruce - Blue	Root Damage	Abiotic disorder	Suspected	2

Spruce - Blue	Spruce Spider Mite	Oligonychus ununguis	Suspected	1
Spruce - not specifield	Chemical Injury	Abiotic disorder	Suspected	2
Spruce - not specifield	Cultural/Environmental Problem	Abiotic disorder	Suspected	1
Spruce - not specifield	Environmental Stress; Problem	Abiotic disorder	Suspected	9
Spruce - not specifield	Growth Regulator Effect	Abiotic disorder	Suspected	1
Spruce - not specifield	Mechanical Damage	Abiotic disorder	Confirmed	1
Spruce - not specifield	Mechanical Damage	Abiotic disorder	Suspected	2
Spruce - not specifield	Pine Needle Scale	Chionaspis pinifoliae	Confirmed	2
Spruce - not specifield	Poor or Insufficient Sample	insufficient sample	Confirmed	2
Spruce - not specifield	Spider Mites	Family Tetranychidae	Confirmed	5
Spruce - not specifield	Spruce Needleminer	Endothenia albolineana	Suspected	1
Spruce - not specifield	Stigmina Needle Blight	Stigmina lautii	Confirmed	5
Spruce - not specifield	Winter Injury	Abiotic disorder	Suspected	8
Spruce - not specifield	Wood Boring Insect Damage		Suspected	1
Spruce - not specifield	Yellowheaded Spruce Sawfly	Pikonema alaskensis	Confirmed	1
Viburnum	Eriophyid Mites	Family Eriophyidae	Confirmed	3
Walnut - Black	Mechanical Damage	Abiotic disorder	Suspected	1
Willow	Chemical; Environmental Injury	Abiotic disorder	Suspected	1
Willow	Inconclusive Sample	Undetermined	Inconclusive	1

Turf/Lawn				
Host	Diagnosis	Taxonomic Name	Confidence	Number of Samples
Bentgrass	Anthrachnose	Colletotrichum graminicola	Suspected	1
Bluegrass; Kentucky	Cultural/Environmental Problem	Abiotic disorder	Suspected	1
Bluegrass; Kentucky	Dense Thatch Layer	Abiotic disorder	Confirmed	1
Bluegrass; Kentucky	Fairy Ring	Various fungi	Suspected	1
Bluegrass; Kentucky	Magnaporthe Summer Patch	Magnaporthe poae	Suspected	3
Type not specified	Algae	General	Confirmed	1
Type not specified	Anthrachnose	Colletotrichum graminicola	Confirmed	1
Type not specified	Chemical; Environmental Injury	Abiotic disorder	Suspected	1
Type not specified	Cultural/Environmental Problem	Abiotic disorder	Suspected	1
Type not specified	Dense Thatch Layer	Abiotic disorder	Confirmed	2
Type not specified	Dollar Spot	Lanzia sp./spp.	Suspected	1
Type not specified	Dollar Spot	Lanzia sp./spp.	Confirmed	1
Type not specified	Environmental Stress; Problem	Abiotic disorder	Suspected	6
Type not specified	Iron Deficiency	Abiotic disorder	Suspected	1
Type not specified	Magnaporthe Summer Patch	Magnaporthe poae	Suspected	2
Type not specified	Melting Out (Turfgrass)	Drechslera catenaria	Suspected	1
Type not specified	Moss	General	Confirmed	1
Type not specified	No Pathogen Found	No-pathogen-found	Not Detected	1
Type not specified	Patch Disease	Unidentified fungus	Confirmed	1
Type not specified	Root Rot	Unidentified fungus	Confirmed	1
Type not specified	Saturated Soils	Abiotic disorder	Suspected	1
Type not specified	Slime Mold	Class myxomycetes	Suspected	1
Type not specified	Turf Necrotic Ring Spot	Ophiosphaerella korrae	Suspected	1
Type not specified	Unknown Abiotic Disorder	Abiotic disorder	Suspected	1
Type not specified	Winter Injury	Abiotic disorder	Suspected	1

Specialists consulted in 2007

The table below is an attempt to recognize the diagnostic assistance and other contributions of various faculty and specialists to the NDSU Plant Diagnostic Lab. Due to the nature of entering these 'consultants' into the database, I may have overlooked a few people. For those who were mistakenly omitted from the list, please accept my sincere apologies.

First Name	Department	Minimum number of Samples
Alan Dexter	NDSU Plant Sciences	4
Art Lamey	NDSU Plant Pathology	3
Berlin Nelson	NDSU Plant Pathology	8
Bill Barker	NDSU Plant Sciences	1
Dale Herman	NDSU Plant Sciences	7
David Franzen	NDSU Soil Science	7
Denise Olson	NDSU Entomology	1
Deying Li	NDSU Plant Sciences	9
Dwain Meyer	NDSU Plant Sciences	3
Febina Mathew	NDSU Plant Pathology	3
Gary Secor	NDSU Plant Pathology	6
Gerald Fauske	NDSU Entomology	8
Hans Kandel	NDSU Plant Sciences	3
Harikrishnan Ramasubramaniam	NDSU Plant Pathology	11
Harlene Hatterman-Valenti	NDSU Plant Sciences	1
Janet Knodel	NDSU Entomology	21
Jeremy Frie	BASF	1
Jim Walla	NDSU Plant Pathology	51
Joe Zeleznik	NDSU Plant Sciences	7
Joel Ransom	NDSU Plant Sciences	5
Julie Pasche	NDSU Plant Pathology	1
Kiersten Wise	NDSU Plant Pathology	1
Kirk Howatt	NDSU Plant Sciences	8
Laura Overstreet	NDSU Soil Science	1
Luis del Rio	NDSU Plant Pathology	2
Marcia McMullen	NDSU Plant Pathology	9
Mark Boetel	NDSU Entomology	1
Michael Kangas	ND Forest Service	8
Neil Gudmestad	NDSU Plant Pathology	1
Patrick Gross	NDSU Plant Pathology	1
Richard Zollinger	NDSU Plant Sciences	21
Robin Lamppa	NDSU Plant Pathology	5
Ronald Smith	NDSU Plant Sciences	5
Sam Markell	NDSU Plant Pathology	1
Shaukat Ali	NDSU Plant Pathology	3
Edward 'Shawn' Dekeyser	NDSU Animal Range Science	13
Steve Valenti	Monsanto	1
Ted Helms	NDSU Plant Sciences	1
Theresa Gross	USDA	1
Tom Scherer	NDSU Ag Engineering	1
Penelope Gibbs	NDSU Microbiology	1
Viviana Rivas	NDSU Plant Pathology	9