

NDSU Plant Diagnostic Laboratory

Annual Report

FY 2004

October 1, 2003 through September 30, 2004

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NDSU Extension Service

Table of Contents

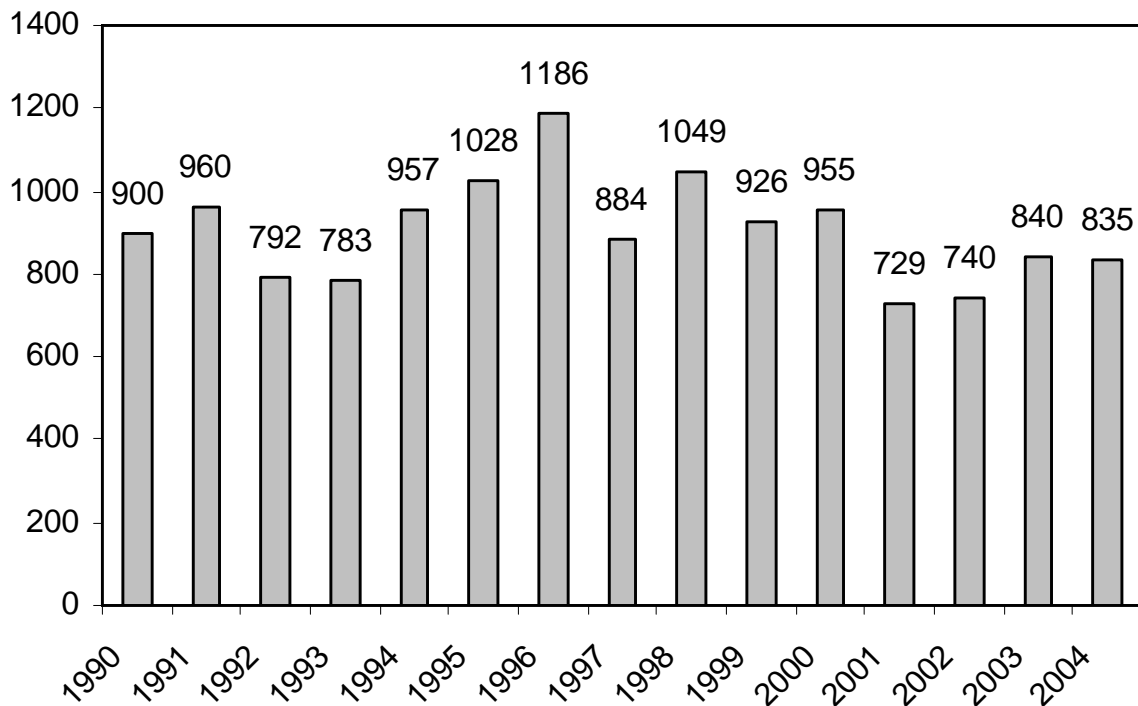
Lab Statistics	3
Total samples Received by Year, FY1990 through FY2004.....	3
FY2004 Monthly Sample Submission.....	4
Samples Received – By Category.....	5
Samples Processed: Plant, Diagnosis, # cases	6
More Sample Statistics.....	13
Samples by Category of Diagnosis	13
Samples by location	14
Income and Expense Report	Error! Bookmark not defined.
Specialists consulted	15

Lab Statistics

Total samples Received by Year, FY1990 through FY2004

A historical perspective of samples received by the lab is presented in the graph below. The 15-year average is 904 samples. The actual number of samples received is probably more than those listed, since a sample sometimes is comprised of multiple samples that were received as a set, and as a result they were given the same lab number (differentiated by numerical or alphabetical extensions). Beginning in FY2005, all samples, even those that are part of a set, will be assigned a unique lab number. This practice will result in a more accurate count of actual samples submitted.

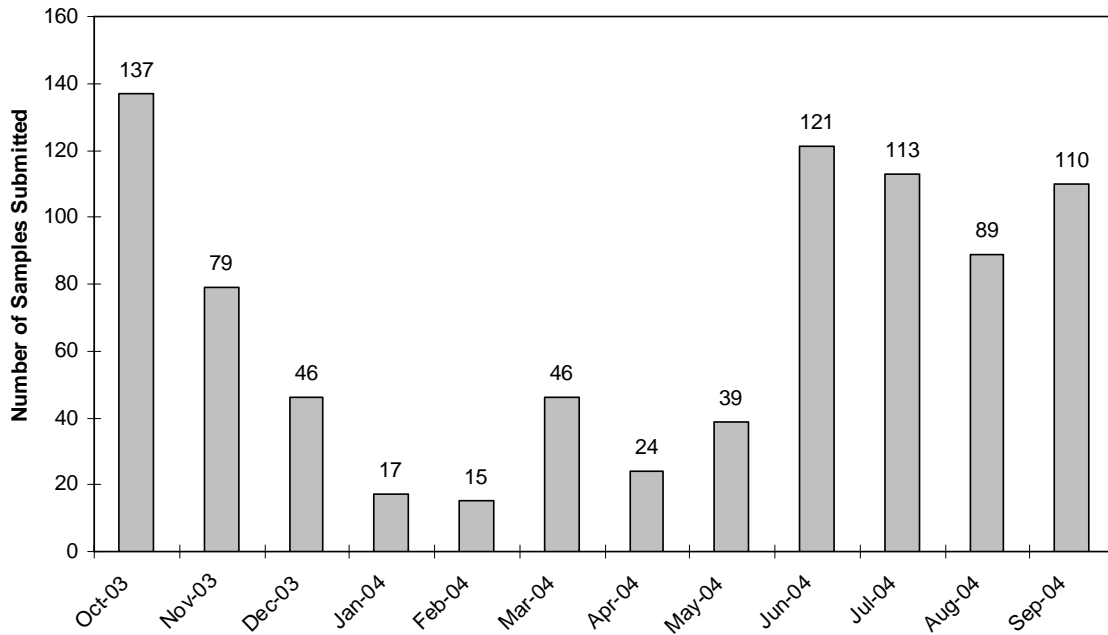
Samples Received by Year



FY2004 Monthly Sample Submission

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 services dominate over the winter months. Costs for seed health testing services are generally higher than routine plant diagnostic services, because labor requirements and other inputs for these tests are often higher.

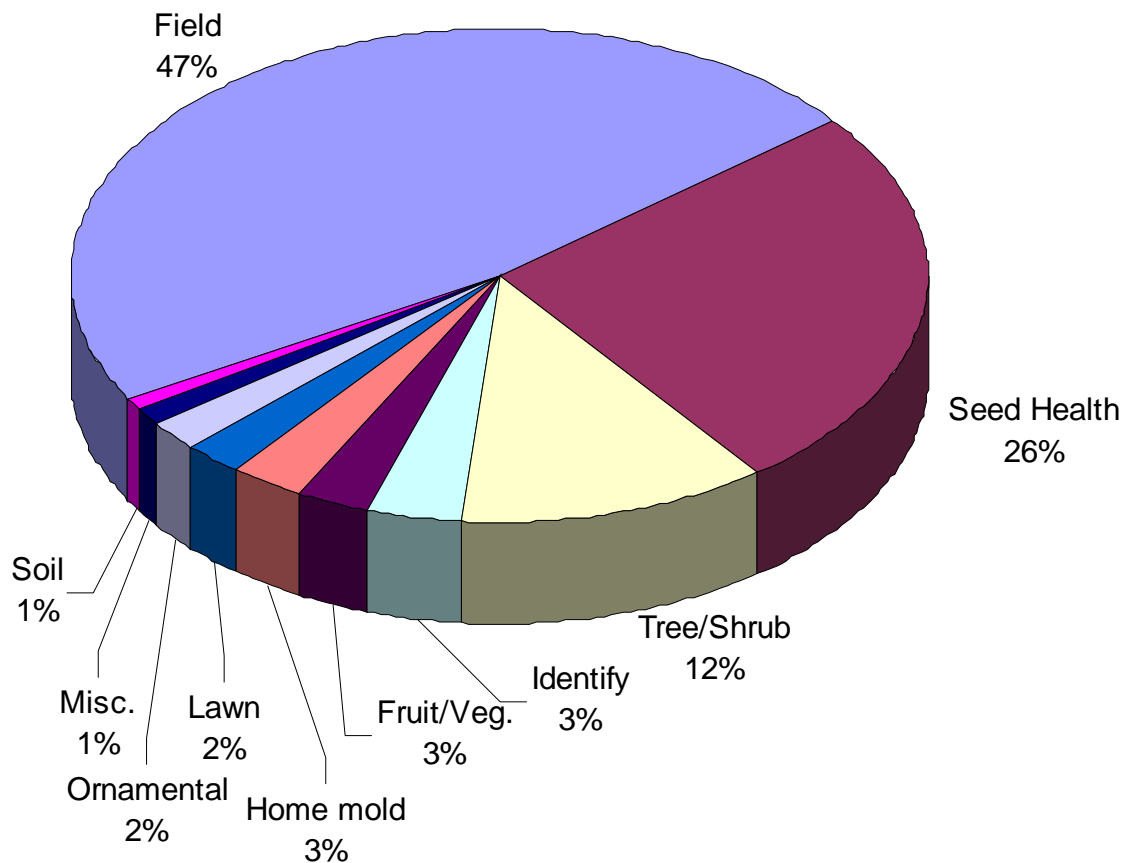
Monthly Submissions FY2004



Samples Received – By Category

A total of 835 samples was submitted in FY2004, and the largest category was field crops, as the pie chart below summarizes. This pattern is similar to prior years, where field crops make up 40% to 56% of submitted samples. Trees and shrubs are consistently the next largest group, if the Seed Health samples are not included. If urban areas grow, and if concerns for rural shelter belt health continue to increase, then it is expected that the proportion of horticulture-related samples will also increase. Increasing the general public's awareness of the services provided by the lab to the commercial sector as well as to homeowners is a goal for FY2005.

This is the first year that Seed Health samples are separated from other plant diagnostic samples. In FY2004, this group was the second largest category of samples submitted. Historical data (annual reports) are not available for seed health samples. With the exception of an unusually high number of bacterial ring rot samples submitted for seed health testing, the numbers of seed health samples received seem typical, compared to prior years.



Samples Processed: Plant, Diagnosis, # cases

The table below summarizes the diagnoses of the lab and the corresponding number of samples, by plant type or sample category. In FY2004, 835 samples were received and 777 of these were processed (a diagnosis or other result was generated). A reasonable diagnosis or result was not provided for 58 samples because they were insufficient or deteriorated (26 samples), the cause of symptoms could not be determined with any degree of certainty (20 samples), or the samples were forwarded to another laboratory (12 samples).

Category	Host	Diagnosis	# of Cases
Alternative	Other	Other	1
		Bacterial leaf spot	1
Field	Alfalfa	Leafhoppers	1
	Barley	Chemical burn	1
		Frost Injury	1
		Herbicide Injury	2
		Other	2
		Pythium	2
	Bean	Cultural	2
		Fusarium	2
		Herbicide Injury	1
		No Herbicide Injury	1
		Other	2
		Pythium	1
		Sclerotinia sclerotiorum	1
		Xanthomonas	2
	Canola	(see rapeseed)	
	Corn	Alternaria	1
		Cold Injury	2
		Drought stress	1
		Environmental	2
		Herbicide Injury	4
		No Herbicide Injury	1
		Negative RUR protein	1
	Flax	Cold Injury	1
		Environmental Injury	1
		Hail Injury	2
		Herbicide Injury	2
Oat	Pseudomonas	1	
Onion	Excess salts	1	

2004 Annual Report of the NDSU Plant Diagnostic Lab

Samples processed, continued:

Category	Host	Diagnosis	# of Cases
	Pea	Herbicide Injury	2
		Other	1
		Probable Ascochyta	1
	Potato	Erwinia carotovora	3
		Frost injury	8
		No herbicide injury	1
		No tuber rots detected	21
		Offtype	1
		Other	2
		Tuber rot(s) present	91
		Spongospora subterranean	1
		Verticillium	1
	Proso millet	Frost injury	1
		No Herbicide injury	1
	Rapeseed	Herbicide Injury	4
		Other	1
	Small grains	Bipolaris sorokiniana	2
		Other	1
		Pseudomonas	1
		Pythium	2
	Soybean	Alternaria tenuis	1
		Cold injury	2
		Compaction	2
		Environmental	4
		Frost injury	1
		Fusarium	1
		Herbicide injury	9
		Iron chlorosis	8
		No herbicide injury	2
		Negative RUR protein	1
		Nitrogen deficiency	1
		Other	4
		Peronospora manshurica	1
		Phytophthora sojae	3
		Positive RUR protein	1
		Pseudomonas	3
		Pythium	2
		Rhizoctonia	3
		Septoria	1
		Probable SMV	3
		Sunscald	1

2004 Annual Report of the NDSU Plant Diagnostic Lab

Samples processed, continued:

Category	Host	Diagnosis	# of Cases
	Sugarbeet	Aphanomyces	2
		Environmental	1
		Fusarium	3
		Herbicide injury	10
		Negative BNYVV	38
		No herbicide injury	1
		Nutrient Deficiency	2
		Other	6
		Positive BNYVV	15
		Pseudomonas	2
		Pythium	2
		Rhizoctonia	1
		Verticillium	1
		Sunflower	Downy mildew
	Environmental		1
	Frost injury		2
	Herbicide injury		7
	No herbicide injury		2
	Other		2
	Phoma		1
	Wheat		Alternaria
		BYDV – negative	1
		Frost injury	2
		Fusarium	1
		Herbicide injury	6
		Melanism	1
		Nitrogen deficiency	1
		Other	2
		Puccinia recondite	1
		Tan spot	1
		WSMV	3
	Winter Wheat	Common bunt	1
		Other	1
		WSMV	1
Fruit	Apple (the actual fruit of the tree; see Tree and shrub category for more diagnoses)	Black spot	2
		Environmental	1
Erwinia amylovora		1	
No herbicide injury		1	
Trametes versicolor		1	
Venturia inequalis		1	
	Other	Aphids	1
		Environmental	1

2004 Annual Report of the NDSU Plant Diagnostic Lab

Samples processed, continued:

Category	Host	Diagnosis	# of Cases
	Raspberry	Drought stress	1
		Herbicide injury	1
		Spider mite	1
	Strawberry	Environmental	1
Greenhouse	Geranium	TSWV	1
Home	Home mold	Chaetomium	5
		No mold detected	5
		Penicillium	2
		Pithomyces	1
		Stachybotrys	6
		Stilbaceae	1
		Unidentified mold contaminant	1
Identify	Insect	Cynipid wasp	1
		Deer tick	3
		Other tick	2
	Other	Ganoderma applanatum	1
		Lepeoda species	1
		Negative lichen	1
		Slime mold	1
		Unidentified inedible fungus	1
	Plant	Ambrosia artemisiifolia	1
		Centaurea macrocephala	1
		Echinochloa crusgalli	1
		Fringed quickweed	1
		Geum canadense	1
		Lotus purshianus or L. americanus	1
		Malva alcea	1
		Nepeta Cataria	1
		Polygonum aviculare	1
		Polygonum erectum	1
		Rumex acetosella	1
		Russian knapweed	1
		Salvia reflexa	1
		Solanum rostratum	1
		Tamarix	1
		Viola sp.	1
Lawn	Bentgrass	Pythium	1
	Kentucky Bluegrass	Environmental	1
		Pythium	1

2004 Annual Report of the NDSU Plant Diagnostic Lab

Samples processed, continued:

Category	Host	Diagnosis	# of Cases
	Other Lawn type	Bipolaris	1
		Cultural	2
		Environmental	1
		Excess Thatch	1
		Mold contaminant	1
		Patch Disease Complex	2
		Pythium	1
		Rhizoctonia	1
		Sclerotinia	1
		Typhula	1
		Winter Injury	1
Miscellaneous	Kochia	Possible herbicide resistance	4
	Other	Other	1
		Rhizoctonia	1
Ornamental	Crabapple	Venturia inequalis	1
	Hibiscus	Bacterial leaf spot	1
	Honeysuckle	Bacterial leaf spot	1
	Impatiens	INSV	1
	Other Flowering	Environmental	1
	Other Ornamental	Herbicide injury	3
	Petunia	Cold injury	1
	Rose	Botrytis	1
		Iron deficiency	1
Seed Health	Bean	Dome tests (ratings: 0-3)	20
	Lentil	Negative Aschochyta	1
	Pea	Negative stem/foliar nematode	4
		Negative cyst nematode	2
	Potato	Negative bacterial ring rot	158
		Negative PMTV	1
		Negative PSTV	4
		Negative PVY	5
		Negative PVY, PLRV	7
		Other	1
		Positive PLRV	1
		Positive PVY	5

2004 Annual Report of the NDSU Plant Diagnostic Lab

Samples processed, continued:

Category	Host	Diagnosis	# of Cases
	Sunflower	Negative stem nematode	4
		Other	2
	Wheat	Negative Tilletia	1
		Negative Urocystis tritici	1
Soil	Soil	Herbicide residue testing	1
		Negative Soybean Cyst Nematode	4
		Rhizoctonia	1
Tree and shrub	Arborvitae/Cedar	Spider mites	1
	Ash – Green	Eriophyes fraxiniflora	1
		Herbicide injury	1
	Ash – Other	Herbicide injury	2
		No herbicide injury	1
		Puccinia	1
		Probable Verticillium	1
	Aspen	Iron chlorosis	1
	Birch	Herbicide Injury	1
	Boxelder	Environmental	1
	Chokecherry	Apiosporina morbosa	1
		Other	1
	Cotoneaster	Iron chlorosis	2
		Phyllostica leaf spot	1
	Elm	Oak leaf blister	1
	Elm – American	Negative Dutch elm disease	2
		Positive Dutch elm disease	7
		Inconclusive Dutch elm disease	1
	Fir	Other	1
	Hawthorn	Gymnosporangium	1
	Honey Locust	Hail Injury	1
	Juniper	Spider mites	1
	Lilac	Drought stress	1
		Herbicide injury	1
		Scorch	1

2004 Annual Report of the NDSU Plant Diagnostic Lab

Samples processed, continued:

Category	Host	Diagnosis	# of Cases
	Maple	Rhizoctonia	1
		Scorch	1
	Oak	Anthraxnose	1
		Cynipid wasp	1
		Oak leaf blister	1
	Other	Environmental	4
		Herbicide Injury	6
		Schizophyllum commune	1
		Septoria leaf spot	1
	Pine	Drought stress	1
		Endrocronartium harknessii	1
		Environmental	1
		Excess salts	1
		Negative pine wilt nematode	1
		Negative Sphaeropsis	1
		Spider mites	1
	Poplar	Cytospora	1
		Environmental	1
	Spruce	Cytospora	1
		Drought stress	1
		Environmental	3
		Herbicide injury	3
		Other	2
		Rhizosphaera needle cast	2
		Probable Sphaeropsis shoot blight	1
		Spider mites	3
		Sunscald/Scorch	1
		Winter injury	7
	Willow	Frost injury	1
Vegetable	Other	Other	2
	Tomato	Environmental	1
		Herbicide injury	4
		Rhizoctonia	1
		Probable Verticillium	1

More Sample Statistics

Number of samples that were walked into the lab: 545

Number of samples that were mailed to the lab: 288

Number that was phoned in: 2

Average turn-around time for diagnostic samples (excluding seed health samples): 9.8 days [Compare to 1991: 11.5; 1990: 4.6; 1989: 7.9; 1988: 2.8]

Samples by Category of Diagnosis

The table below summarizes the types of samples received and the diagnosis category. The category of diagnosis includes both positive and negative samples. For example, under the Seed Health category, 178 samples were included in the Bacteria category of diagnosis. However, this number reflects the number of tests that were specifically evaluating for bacteria. In this case, all of the samples that were evaluated for bacterial ring rot on potato tested negative for the presence of this pathogen, and most of the samples that were evaluated for bacterial pathogens of bean had low levels of bacteria present.

Samples Per Category	Category of Diagnosis (positive or negative)								
	Bacteria	Fungi	Virus	Insect	Herbicide	Environment *	Nutrient	All Other	
Field crop	401	57	89	61	1	57	34	13	89
Seed Health	209	178	3	20	0	0	0	0	8
Tree & Shrub	98	0	27	0	8	15	25	4	19
Identify	29	0	5	0	6	0	0	0	18
Fruit/Vegetable	24	1	6	0	2	6	5	0	4
Home mold	23	0	16	0	0	0	0	0	7
Lawn	18	0	10	0	0	0	4	0	4
Misc/Orn./Soil/Alt/ Greenhouse	33	3	4	2	1	8	3	1	11
Totals	835	239	160	83	18	86	71	18	160

* Does not include cultural problems or fertility issues. Includes drought, temperature, hail, sunscald, winter injury, and lightning.

Samples by location

The primary purpose of the NDSU Plant Diagnostic Lab is to serve residents of North Dakota. Out-of-state residents also submit samples, but they are charged a higher fee, and they are encouraged to use their respective state diagnostic labs. In North Dakota, county agents are granted four 'reference samples' which are evaluated at no charge by the lab (see *Reference Samples* section under the Lab Fees heading for more information). The tables below summarize where samples originate. Thank you for supporting the lab!

By County (North Dakota only)	
Barnes	7
Benson	4
Bowman	3
Burke	1
Burleigh	24
Cass	177
Cavalier	14
Dickey	5
Divide	3
Eddy	5
Emmons	5
Foster	5
Golden	2
Grand	11
Griggs	1
Hettinger	14
Kidder	11
LaMoure	8
Logan	3
McHenry	4
McIntosh	6
McKenzie	2
McLean	3

Continued, by County	
Mercer	5
Morton	6
Mountrail	1
Oliver	1
Pembina	15
Pierce	1
Ramsey	5
Ransom	8
Renville	4
Richland	26
Rolette	2
Sargent	2
Sheridan	3
Starke-Billings	10
Steele	1
Stutsman	8
Towner	20
Trail	6
Walsh	27
Ward	6
Wells	10
Williams	6

Out-of-State Location	Number of Samples Submitted
Canada (Manitoba)	18
Michigan	52
Minnesota	230
Montana	5
Nebraska	16
South Dakota	14
Texas	2
Wisconsin	5

Specialists consulted

One of the greatest advantages that the NDSU Plant Diagnostic Lab can offer is the availability of a wide range of expertise. This expertise usually comes in the form of faculty and other specialists who are willing and able to support the lab. Of the 835 samples received, 153 relied on the expertise of faculty and other specialists. The assistance that these experts provide to the lab is immeasurable. Thank You.

Specialist consulted	Number of samples
Ali, S.	3
Barker, W.	4
Berglund, D.	6
Biller, C.	338
Bradley, C.	12
Dekeyser, E	1
del Rio, L.	2
Dexter, A.	10
Esslinger, T.	1
Fauske, G.	5
Franzen, D.	2
Glogoza, P.	2
Good, J.	3
Hatterman-Valenti, H.	2
Kinzer, K.	306
Li, D.	6
Lym, R.	1
McMullen, M.	16
Nelson, B.	7
Riviera-Varas, V.	2
Secor, G.	1
Smith, R.	6
Stack, R.	4
Taylor, R.	1
Walla, J.	36
Zeleznik, J.	1
Zollinger, R.	11
Other	8