

RUTGERS COOPERATIVE EXTENSION

NEW JERSEY AGRICULTURAL EXPERIMENT STATION

**Rutgers Plant Diagnostic Laboratory
and
Nematode Detection Service**



1999 Annual Report

THE STATE UNIVERSITY OF NEW JERSEY
RUTGERS

Rutgers Plant Diagnostic Laboratory and Nematode Detection Service 1999 Annual Report

Mr. Richard Buckley
Laboratory Coordinator

Introduction

The mission of the Rutgers Plant Diagnostic Laboratory and Nematode Detection Service (RPDL-NDS), a service of the New Jersey Agricultural Experiment Station (NJAES), is to provide the citizens of New Jersey with accurate and timely diagnoses of plant problems. These goals are achieved in cooperation with Rutgers Cooperative Extension (RCE) and the research faculty at Cook College/NJAES. Since its establishment in April of 1991, the Plant Diagnostic Laboratory has examined over 10,430 samples submitted for plant problem diagnosis, nematode analysis, or identification. The laboratory has become an integral part of Rutgers Cooperative Extension and Cook College/NJAES programs by providing diagnostic and educational services and by assisting with research. This report summarizes the activities of the RPDL-NDS during the calendar year 1999, the laboratory's eighth full year of operation.

History

The Rutgers Plant Diagnostic Laboratory was established in 1991 with an internal loan and is projected to become self-supporting. The laboratory was established by the dedicated efforts of RCE faculty members Dr. Ann B. Gould and Dr. Bruce B. Clarke, Specialists in Plant Pathology, Dr. Zane Helsen, Director of Extension, and Dr. Karen Giroux, past Assistant Director of NJAES. Without their vision and persistence, this program would not exist.

On April 1, 1991, a laboratory coordinator was hired on a consultant basis to renovate laboratory space and order equipment. The laboratory was housed in Building 6020, Old Dudley Road, on the Cook College Campus until April 1, 1999. Our current location is

room 5, Martin Hall, which is part of the Department of Pathology. They paid for renovations to the facility and assisted in the move. We acknowledge the Department's generosity and thank them for their support.

The Rutgers Plant Diagnostic Laboratory began accepting samples on June 26, 1991. At that time, the majority of equipment and supplies were in place. A full-time diagnostician (program associate) was hired September 1, 1991, and the laboratory coordinator was hired on a permanent basis on November 1, 1991.

Staff and Cooperators

Richard J. Buckley is the coordinator of the RPDL-NDS. He was promoted to this position from program associate in October of 1993. Mr. Buckley received his M.S. in Turfgrass Pathology from Rutgers University in 1991. He has a B.S. in Entomology and Plant Pathology from the University of Delaware. He also received special training in nematode detection and identification from Clemson University. Mr. Buckley has work experience in diagnostics, soil testing, and field research. He is responsible for sample diagnosis, soil analysis for nematodes, and the day-to-day operation of the laboratory. Mr. Buckley's former position as program associate remains unfilled.

In 1999, the laboratory was also staffed, part-time, by an undergraduate student, Ms. Sabrina Tirpak. Ms. Tirpak, a senior in the Department of Plant Science, has been an excellent technician and has become an integral part of the daily activities of the laboratory.

Two additional part time employees served the laboratory in 1999. Mr. Deepok Matadha, a graduate student in the Department of Entomology, assists with insects identifications. Mr. Matadha is assigned to the

laboratory part-time for his graduate assistantship. Ms. Clare Liptak, former Somerset County Agricultural Agent, serves as Rutgers Resource Center Home Horticulturist. She has assumed leadership in marketing laboratory services to all client groups.

The laboratory benefits from the assistance of faculty in the Departments of Entomology, Plant Pathology, and Plant Science. In the Department of Plant Pathology, Dr. Ann B. Gould (Laboratory Faculty Coordinator) and Dr. Bruce B. Clarke have devoted hundreds of hours to laboratory business from the inception of the diagnostic laboratory concept through its eventual set-up and operation. Additional faculty and staff in this department who have provided substantial assistance during 1999 include: Dr. James White and Dr. Marshal Bergen, mycology; Dr. Donald Kobayashi, phytobacteriology; Dr. Steve Johnston, vegetable pathology; and Dr. Brad Hillman, virology.

We would also like to thank Dr. John Meade, Dr. Richard Ilnicki, and Dr. Steve Hart of Plant Science for assistance in weed identification and diagnosis of herbicide injury; and Dr. George Wulster of Plant Science for assistance with problems on horticultural crops. Our sincere gratitude goes to Ms. Ethel M. Dutky of the University of Maryland Plant Diagnostic Laboratory. Her advice and assistance has been instrumental in the set-up and operation of the RPDL-NDS.

LABORATORY POLICY

The RPDL-NDS receives samples from a variety of clientele. According to laboratory policy, samples for diagnosis from residential clients may be submitted only after screening by appropriate county faculty or staff. If the sample requires more than a cursory diagnosis, it may be submitted, along with the appropriate payment, to the laboratory for evaluation. The county office provides the appropriate form, including instructions for proper sample selection and submission. Samples from professional clientele may be handled as above or may be submitted directly to the laboratory.

Detailed records are kept on all samples. A written response, including the sample diagnosis, management and control recommendations, and other pertinent information, is mailed or sent by FAX to the client. Additionally, the client is billed if payment does not accompany the sample. Copies are forwarded to the appropriate county faculty for their records. Commercial growers are contacted by telephone or FAX to help them avoid delay in pest treatments.

OPERATIONS

Diagnostics

During 1999, the RPDL-NDS examined 1,528 specimens submitted for diagnosis or identification (Table 1A) and assayed 152 soil samples for nematodes (Table 2). Compared to 1998 levels, this represents a 9% increase in plant samples and a 8% increase in nematode samples. As expected, the majority of samples were submitted during the summer months and diminished in the fall and winter.

The Nematode Detection Service began accepting soil samples on July 1, 1992, after the retirement of Dr. Jack Springer. In 1999, the Nematode Detection Service processed 152 soil samples for nematode assays. The increase in nematode samples is due in part to the influence of heat and drought stress on nematode populations and turf injury on golf courses. Many of the golf turf clients have identified nematodes as potential problems on golf greens and have begun to sample the greens for nematodes as they develop integrated management programs. This active management by golf course superintendents, using laboratory services as part of their integrated pest management programs, initially resulted in an increase in sample submissions. As problem areas were identified and controlled, sample submissions subsequently dropped. Regular monitoring of the "hot spots" continues, but large scale sampling is not necessary for these clients at this point. This season, heat stress increased the need for golf turf managers to check on their "hot spots," which resulted in a slight increase in submissions.

Of the specimens submitted to the RPDL-NDS for diagnosis or identification in 1999, 69% were from commercial growers; 18% were from residential clientele; and 13% were submitted from research faculty at Rutgers University (Table 3). Of the samples submitted to the Nematode Detection Service, 97% were from commercial growers; 3% were from Rutgers research projects; and 0% were from residential clients. We expect that the number of nematode samples submitted from residential clients will remain low, since much of this clientele is not familiar with nematode pests.

Although samples from research programs represent a relatively small percentage of the total number of plant and soil samples received, they are an extremely important component. Research samples allow the

**Table 1A. RPDL-NDS Plant Sample Submissions by Month—Rutgers University
–1994 to 1999.**

Month	1994	1995	1996	1997	1998	1999
January	11	22	27	27	32	16
February	14	22	21	24	26	32
March	31	51	50	51	52	72
April	56	59	60	121	118	86
May	70	137	84	125	166	183
June	146	161	206	202	240	227
July	172	147	271	222	243	326
August	135	246	192	178	233	222
September	75	106	155	173	161	170
October	55	61	82	95	113	88
November	28	49	36	22	54	71
December	29	7	22	30	28	35
Total:	822	1068	1206	1269	1466	1528

Table 2. RPDL-NDS Nematode Sample Submissions by Month—1994 to 1999.

Month	1994	1995	1996	1997	1998	1999
January	0	6	0	0	1	0
February	0	0	0	1	0	1
March	14	1	35	6	4	1
April	41	24	16	22	14	14
May	3	6	17	14	8	27
June	9	14	37	33	20	15
July	55	18	80	30	31	47
August	25	19	21	25	18	23
September	11	11	4	9	17	7
October	14	10	9	7	10	11
November	40	13	11	0	1	2
December	7	7	12	0	8	4
Total:	219	129	242	147	132	152

diagnosticians to cooperate with university faculty on problems often of great importance to the State of New Jersey. The problems associated with these samples are challenging, and occasionally lead to the diagnosis of a new disease.

Turfgrass and ornamentals may represent the largest agricultural commodities in New Jersey. In support of New Jersey as an urban agriculture state, it follows that the vast majority of samples submitted for diagnosis to the laboratory (80%) were either turfgrass or ornamental plants (Table 4). The wide variety of turf and ornamental species grown under diverse environmental conditions in our state results in a large number of

problems not readily identifiable by growers or county faculty. Furthermore, pest diagnosis and plant identification for commercial growers of other crops are still handled by extension specialists and county agents in other parts of the state, at no charge. This practice limits the number of production agriculture samples sent to the laboratory. Soil samples submitted to the laboratory for nematode analysis were primarily from golf turf, with most of the remaining samples originating from production agriculture. The majority of the samples from production agriculture were from several growers in southern New Jersey who specialize in peaches or carrots. In addition, nematode samples from growers who are establishing vineyards are increasing. Special

Table 3. RPD-L-NDS Sample Submissions by Origin—1999.

Sample Origin	Number of Plant Samples	Percent of Total	Number of Nematode Samples	Percent of Total
Commercial Growers	1059	69%	148	97%
Residential	274	18%	0	0%
Research Programs (Rutgers University)	195	13%	4	3%
Total:	1528	100%	152	100%

Table 4. RPD-L-NDS Sample Submissions by Crop Category—1999.

Crop	Number of Plant Samples	Percent of Total	Number of Nematode Samples	Percent of Total
Turf	667	43.7%	122	80%
Ornamentals	557	36.5%	4	3%
Field Crops	5	0.3%	1	1%
Vegetable	39	2.6%	11	7%
Fruit	39	2.6%	14	9%
Insect ID	166	10.9%	0	0
Plant ID	36	2.4%	0	0
Fungus ID	19	1.2%	0	0
Total:	1528	100%	152	100%

thanks go to the IPM agents in vegetable and fruit crops for their support.

Samples were submitted to the RPDL-NDS from all of the counties in New Jersey (Tables 5A and 5B). The majority of samples, however, were submitted from counties in close proximity to the laboratory or from counties with dense populations that have disease problems associated with turf and ornamentals in residential landscapes or on golf courses. Disease problems on these commodities are difficult to diagnose and are, subsequently, submitted to the laboratory. Furthermore, many citizens in central New Jersey contact Rutgers University directly for assistance with

plant-related problems and are then referred to the laboratory. The profile also identifies county faculty that promote and utilize RPDL-NDS services.

Approximately 21% of the samples submitted for diagnosis to the laboratory were from out-of-state (Table 5A and 5B). Nearly all of these samples were turf. Due to his national reputation and his strong support for the laboratory, Dr. Bruce Clarke has helped the Rutgers laboratory develop into one of the premier golf turf diagnostic facilities in the country. Many golf course superintendents send samples to Dr. Clarke, who always forwards them to the laboratory for diagnosis. Golf turf samples were submitted to the labora-

Table 5A. RPDL-NDS Sample Submissions by County-1994 to 1999.

In-State	1994	1995	1996	1997	1998	1999
Atlantic	40	42	42	57	81	94
Bergen	60	62	71	85	75	81
Burlington	31	54	67	97	67	69
Camden	25	37	42	37	38	61
Cape May	10	9	16	25	55	34
Cumberland	14	7	8	15	22	30
Essex	30	22	20	22	23	28
Gloucester	26	61	19	21	21	15
Hudson	0	6	1	16	9	5
Hunterdon	37	31	22	27	25	39
Mercer	65	47	44	28	42	52
Middlesex	85	119	129	157	141	132
Monmouth	59	77	58	87	101	100
Morris	34	53	90	56	90	119
Ocean	17	56	63	37	39	59
Passaic	19	44	69	68	50	42
Salem	9	11	12	6	14	18
Somerset	51	52	54	91	150	89
Sussex	6	13	15	13	10	12
Union	20	56	27	63	82	56
Warren	33	29	30	30	26	34
Rutgers Research	74	67	81	32	62	68
In-State Total:	725	953	981	1070	1223	1237
Out-of-State:	97	115	225	199	243	291
Total:	822	1068	1206	1269	1466	1528

tory from 17 states, several from states as far away as Florida, New Mexico, and California. New York, Pennsylvania, and Northern Virginia provided the largest totals. Almost half of the turf samples submitted in 1999 (43%) were from out-of-state. Since there are very few laboratories in the country that diagnose turfgrass diseases, satisfied out-of-state superintendents have continued to submit samples to the RPDL-NDS. Furthermore, many golf turf professionals at other universities often refer their clients to Rutgers for second opinions or when they are on leave. The charge for out-of-state samples is substantially higher to help defray the cost of in-state samples. This area of client development is one of the fastest growing areas in the laboratory and a significant source of income.

Of the plant specimens submitted to the RPDL-NDS for diagnosis or identification, 38% were associated with biotic disease-causing agents (Table 6). Injury to 7% of the samples was caused by insects and related arthropods, and 40% were associated with abiotic injuries and stresses (e.g., environmental extremes, nutrient deficiencies, poor cultural practices, poor soil conditions, etc.). Another 15% included insect, plant, fungal, and substance identification. The overall breakdown in sample submissions is typical of that reported by other diagnostic laboratories in the United States.

Insects account for most of the organisms identified by the laboratory. The laboratory is benefiting from an increased cooperation with the Department of Ento-

Table 5B. RPDL-NDS Nematode Submissions by County—1994 to 1999,

In-State	1994	1995	1996	1997	1998	1999
Atlantic	1	2	16	7	7	2
Bergen	13	3	2	0	1	1
Burlington	58	38	40	35	5	19
Camden	9	15	37	14	25	16
Cape May	1	0	2	1	2	0
Cumberland	23	10	2	2	1	8
Essex	4	4	1	2	1	2
Gloucester	7	10	22	10	2	12
Hudson	0	0	0	0	0	0
Hunterdon	1	2	1	2	3	4
Mercer	15	0	21	0	7	0
Middlesex	4	7	5	1	4	0
Monmouth	7	1	0	0	3	5
Morris	7	5	5	4	6	9
Ocean	0	0	0	0	1	0
Passaic	3	0	3	2	5	1
Salem	23	3	9	0	8	3
Somerset	3	0	0	0	0	0
Sussex	1	0	2	0	0	0
Union	0	0	0	0	1	1
Warren	0	0	0	0	0	0
Rutgers Research	0	0	18	1	4	4
In-State Total:	180	100	184	81	86	87
Out-of-State:	39	29	58	66	46	65
Total:	219	129	242	147	132	152

Table 6. RPDL-NDS Plant Sample Submissions by Diagnosis—1999.

Diagnosis	Number of Samples	Percent of Total
Disease (biotic)	575	38%
Insect pest	118	7%
Identification (insect, plant, fungus)	222	15%
Other	613	40%
Total:	1528	100%

mology. The assignment of an entomologist to the laboratory in 1999 and an effort to properly refer clients directly to the laboratory by the Department of Entomology will continue to enhance our efforts to serve New Jersey residents with accurate insect identifications. It is our hope that this cooperative effort continues to grow in the coming years.

In 1999, the mean response time for samples diagnosed in less than 21 days was 1.5 days. This maintains our increase in timeliness from the 1997 mean response time of 2.05 days. The rapid response time is attributed largely to the presence of our competent staff. Mr. Matadha from Entomology is an essential aid and Ms. Tirpak, our student assistant, has developed into an employee who can easily fulfill the responsibilities of a program associate or horticultural consultant. Mr. Matadha and Ms. Tirpak both joined our staff in 1997. Adequately trained staff is essential to the continued growth and efficient operation of the laboratory.

A laboratory response was prepared in less than

three days for most (87%) of the samples submitted (Table 7), and 94% of our clients received a response in less than a week. A number of the samples took longer than ten days to diagnose. In these cases, special consultation was required for an accurate diagnosis, and the clients were advised of progress throughout the period. Since nematode samples deteriorate rapidly in storage, virtually all of the nematode processing was finished in less than three days.

Other Laboratory Activities

Teaching. In addition to providing diagnostic services, the staff of the RPDL-NDS provides educational services to Cook College/NJAES, Rutgers Cooperative Extension, and other agencies (Appendix II). Many of these educational services generated additional income for the laboratory.

In 1999, Mr. Buckley participated in a number of short courses offered by the Office of Continuing Professional Education. Mr. Buckley is an instructor

Table 7. Sample Response Times—1999.

Response Time	Number of Samples	Percent of Total
0 to 3 days	1321	87%
4 to 6 days	102	6%
7 to 10 days	76	5%
11 to 21 days	20	1%
>21 days	9	1%
Total:	1528	100%

in the Rutgers Professional Golf Turf Management School. In 1999, he taught five courses in both the spring and fall sessions: Diseases of Turf; Diseases and Insect Pests of Ornamental Plants; Insect Pests in Fine Turf; Principles of Pest Management on the Golf Course; and Weed Identification. The Professional Turf Management School consists of two ten-week sessions each year. Mr. Buckley's teaching commitment consists of approximately 180 hours of student contact time each year. Ms. Clare Liptak also spent countless hours assisting Mr. Buckley in evaluating weed collections for his course in weed identification. Mr. Buckley's efforts in the Professional Golf Turf Management School generated \$18,865 in income for the laboratory in 1999.

Mr. Buckley participated in several other Office of Continuing Professional Education short courses in 1999. These courses include: Professional Parks Maintenance; Golf Turf Management School: Three Week Preparatory Course; Home Gardeners School; Landscape Integrated Pest Management: An Intelligent Approach; Athletic Field Maintenance; and the Christmas Tree Growers Short Course. The income generated by these activities with the Office of Continuing Education was \$1,375.

Mr. Buckley served as the course coordinator for Advanced Topics in Professional Grounds Maintenance: Turf Disease Short Course. This was the first year for this one-day program. The income generated by this program with the Office of Continuing Education was \$850.

Mr. Buckley was an invited speaker in several Rutgers Cooperative Extension programs. These programs included: North Jersey Ornamental Horticulture Conference, Turfgrass, Landscape, and Tree days. Lectures in support of the Mercer, Middlesex, Ocean, Essex, and Hunterdon/Somerset County Master Gardener Programs also were given. Additionally, Ms. Clare Liptak lectured in support of the Master Gardener programs in Somerset, Passaic, and Union County.

Mr. Buckley also earned income for the RPDL-NDS as an invited speaker for New Jersey Turf Expo; Reed and Perrine-Turf Care Seminar; Certified Tree Experts Training; Bergen County Landscape Contractors Trade Show; New Jersey International Society of Arboriculture Annual Conference; Penn State Northeast Regional Turf Seminar; Professional Lawn Care Association of America Annual Conference; and the Novartis Regional Sales Meeting. The income from all of the non-OCPE talks was \$1925.

Other educational services provided by the staff of the RPDL-NDS, for which the laboratory received no compensation, included lectures in undergraduate and graduate courses including Fine and Sports Turf, Horticultural Topics, and Greenhouse Environmental Management. Mr. Buckley also participated in the filming of several television shows developed by Extension Faculty in Middlesex County. Short presentations, describing how to utilize RPDL-NDS services, were given to several groups and at several Office of Continuing Professional Education short courses.

Extension Publications. During 1999, the RPDL-NDS staff contributed regularly to the Plant & Pest Advisory. The laboratory staff wrote a brief article on laboratory activities for each issue of the newsletter by Rutgers Cooperative Extension and the New Jersey Agricultural Experiment Station. The newsletter was published bi-weekly from March to September and monthly from September to December. Several extension fact sheets were co-written during the year and are currently under review.

Service. Mr. Buckley served as a member of the Rutgers Cooperative Extension Home Horticulture Working Group and the Resource Center Advisory Committee. Mr. Buckley also participates as the regional turf pathologist with shortCUTT – a conference call, in-service, outreach, and newsletter program – sponsored by Cornell University.

Marketing

The RPDL-NDS developed a 15 minute slide presentation to help advertise laboratory services to various grower groups. Copies of this presentation are available on loan to anyone who wishes to advertise the laboratory's services. Numerous presentations of this program were made throughout 1999 by the staff of the Plant Diagnostic Laboratory.

An advertising brochure was developed in 1992 for general distribution at county offices, grower meetings, and other activities. This brochure briefly describes the services of the RPDL-NDS and how to access them. To date, well over 20,000 copies of this brochure have been distributed. The brochure is currently being reviewed and revised. Once again, special thanks goes to the Department of Continuing Professional Education, who placed a copy of the advertising brochure in each short course educational packet distributed.

To help advertise laboratory services at grower meetings or other activities, a mobile display unit was developed. This display unit briefly describes the services of the RPD-L-NDS and how to access them, and is available on loan to anyone who wishes to advertise the laboratory services. Ms. Liptak has taken over the responsibility of representing the laboratory with the display unit at fairs, trade shows, and other events. She has updated the presentation of the display using the Rutgers Resource Center poster maker and purchased a literature rack to provide selected extension publications to the attendees of these events. In 1998, her initiative brought the display to the Eastern Regional Nurserymen's Association trade show. As a result of client interest at the ERNA show, packets of laboratory submission forms were provided to several garden center operators for distribution to interested customers. These packets of laboratory information were offered at all appropriate events in 1999. The events at which the display was utilized in 1999 included: North-Jersey Ornamental Horticulture Conference, Vegetable Growers Association Trade Show, NJ Nursery and Landscape Association Trade Show, NJ Landscape Contractors Association Trade Show, NJ Flower and Patio Show, Ag Field Day, Rutgers Gardens Spring Flower Fair, Rutgers Gardens Open House, Turf Field Day, Somerset County 4-H Fair, Turf Expo, and the ERNA Trade Show. Several events are planned for 2000.

Funding

The Plant Diagnostic Laboratory is expected to be self-supporting. Funding for the laboratory is generated by charging clientele for diagnostic services and educational activities.

The 1999 fee schedule for diagnostic services and nematode assays was:

Residential Clients	\$20.00/sample
Commercial Growers:	
Fine turf	\$50.00/sample
All others	\$20.00/sample
Out-of-State Growers	\$75.00/sample

Over \$64,864.51 was generated from diagnostic services and nematode assays during 1999, representing a 14% increase in income over 1998.

A sample submission form and the appropriate payment accompanied the majority of samples received from residential clientele. Most commercial samples were accompanied by a submission form; however, the majority of these submissions did not include payment. In most cases, commercial growers preferred to be sent a bill. Almost 100% of the clients billed have remitted payment, and, the laboratory continues to recover outstanding accounts from past years. Almost all of the samples diagnosed for research programs at Rutgers University were paid for by transfer of funds.

Laboratory policy allows Rutgers employees, county faculty, extension specialists, and selected government agencies to submit a small number of samples "free of charge." These samples are to be used for educational development and government service. The laboratory also receives a number of direct requests for

Table 8. Plant Diagnostic Laboratory Sample Submissions--No Charge Requests.

Client Category	Number of Samples
RCE County Faculty/Program Associates	84
RCE Specialists	11
Rutgers Research Programs (not RCE)	33
Rutgers Non-Research Faculty/Staff	41
Direct Mail/Walk-ins	61
Other Government Agencies/University	7
Total:	237

free service from the public. In many cases, letters are sent to the "Department of Agriculture" or to some other non-address. These requests for information eventually find their way to the laboratory. The Plant Diagnostic Laboratory processed 237 "no charge" samples in 1999 (Table 8). These samples accounted for 14% of the samples processed. The value of these "no charge" requests was \$4,480.

Income generated from all laboratory activities covered 100% of the non-salary expenses incurred in 1999. For more detailed budget information, see Appendix I.

Future Directions

As in the past, the top priority for 2000 will be to generate more income. To accomplish this, we will continue to advertise laboratory services. Ms. Liptak has generated a list of trade shows, field days, fairs, and educational programs to attend with the display unit. Continued cooperation with the Office of Continuing Professional Education and other educational activities are expected to generate additional funds.

Sometime in the late-spring of 2000, the laboratory will move into a permanent facility on Hort farm 2 (turf farm) off of Ryders Lane in North Brunswick. The new laboratory space in the Turfgrass Education Center, which is currently under construction, was made possible by private grants and strong turf industry support. We are especially grateful for the support of the turf industry and wish to thank all of those who helped make the building possible.

Other priorities in 2000 include: the development of additional educational materials in the form of bulletins, fact sheets, and slide sets in cooperation with extension faculty; focusing on ways to add and train labor for the laboratory during its busiest periods; and professional improvement (which includes participation in professional societies).

We are constantly evaluating the immediate and future needs of the State for additional services. Your suggestions are welcome.

Plant Disease Highlights

The occurrence and severity of plant diseases are strongly influenced by environmental conditions. In 1999, extremes in moisture played a prime role in plant health. Through most of the summer, drought was the biggest issue. In late-summer the occurrence of two

hurricanes and local flooding has proven to have had a significant impact on plant problems.

Ornamentals

As usual, a vast majority of ornamental plants submitted to the laboratory were affected by abiotic agents. The symptoms of these problems appeared as leaf scorch, premature defoliation, branch dieback, early and late fall color, and an overall decline in plant vigor. Planting problems and poor site conditions were a primary cause of many plant failures. The cumulative effects of several seasons of erratic and extreme weather also contributed strongly to many plant failures. The dry weather that started in early spring and carried on until the hurricane season caused many new plantings to fail. White pine may be the most frequent submission to the laboratory. The tree is used in virtually every landscape and is often watered into submission when it is transplanted.

Of the diseases that were caused by biotic agents, Cankers caused by the fungi *Botryosphaeria*, *Atropellis*, and *Cytospora*, were prevalent in trees and shrubs injured during the drought years of 1993, 1995, and 1999. *Cytospora* was the most common fungal canker and was especially prevalent on various species of Maple. Diplodia tip blight, another stress related disease, was common on two and three needle pines. Root-infecting pathogens detected this year on a variety of ornamental plants included *Phytophthora*, *Pythium*, *Fusarium*, *Thielaviopsis*, and *Rhizoctonia*.

Of particular note is the increased incidence of bacterial leaf scorch in shade trees. A record number of oak samples tested positive for the disease during September and October. Since the bacterium that causes the disease affects xylem tissue, symptom expression is enhanced during periods of moisture stress.

1999 was the year of the mite. Spruce mites, two-spotted spider mites, and many types of eriophyid mites were identified on many different plants. Mites are often a problem during warm, dry seasons. Boring insects were also quite common in 1999. Bark beetles, flatheaded and roundheaded borers, and clear-winged moths were particularly common. Like the cankers, borer problems are predisposed on trees that may have been initially stressed during the droughts of 1993 and 1995. White pine had a particularly tough season with borers. Presumably these trees were predisposed by excess moisture in the root zone during transplant. We had several Asian longhorned beetle scares that all turned out to be pine sawyer beetles.

In the greenhouse, root rot caused by *Pythium*, *Rhizoctonia*, and *Thielaviopsis* continue to be the most common problem. Botrytis gray mold is always a problem. Nutrient and salt problems are also prevalent. Several growers submitted samples to the laboratory of a variety of plants that tested positive for the tospoviruses, impatiens necrotic spot or tomato spotted wilt. Bacterial wilt (*Xanthomonas*) and southern wilt (*Pseudomonas*) of geranium were common during the spring.

Turf

It was not an easy year for fine turf in New Jersey and the mid-Atlantic region. A local superintendent called July 6th the day of death. Early-July brought 100 degree temperatures to the region. Since many golf greens are predominately annual bluegrass, a winter annual weed, sustained heat caused massive sudden death. Close to 25% of our total submissions came during July and August largely due to heat stress on golf turf. *Pythium* blight outbreaks were especially common as superintendents watered excessively to reduce heat and drought. Anthracnose continues to be

the most common summer disease on golf courses. Anthracnose is a disease problem that is most common on stressed turf. Gray leaf spot, an emerging epidemic of perennial ryegrass, continued to keep local golf course superintendents jumpy. Dozens of samples were submitted to the laboratory with suspect symptoms that turned out to be drought stress or caused by other leaf spot pathogens like *Bipolaris sorokiniana* or *Drechslera siccans*. After the hurricanes, the region suffered from an epidemic of gray leaf spot; however, most of the injured turf was in southern New York, Long Island, and Connecticut. In previous seasons the disease was found primarily in southern regions and mid-Atlantic states. This year also saw the disease move to residential lawns and sports fields. Finally, a new disease, dead spot, caused by the fungus *Opiosphaerella* spp. is emerging in New Jersey as a problem in newly seeded bentgrass golf greens.

Vegetables, Fruits, and Field Crops

In vegetables, root knot nematode in carrots continue to be a primary concern. Bacterial wilt of cucurbits was also quite common.

APPENDIX I. Rutgers Plant Diagnostic Laboratory and Nematode Detection Service–Budget

Table 9. RPDL-NDS Approximate Expenditures in 1999 (excluding salaries).

Salaries & Benefits: (student help)	\$11,589.16
Supplies and Services:	\$7,463.06
Diagnostic supplies	
Printing/advertising	
References/publications	
Equipment maintenance	
Office supplies	
Photographic services	
Capital Equipment: (one-time purchase)	\$0.00
Communications(approximate):	\$1987.53
Telephone/FAX	
Postage	
Travel:	\$722.80
Travel to give paid talks	
Travel to professional meetings	
Marketing expenses	
Total Expenditures	\$21,762.55

Table 11. RPDL-NDS Estimated Expenditures for 2000.

Seasonal labor:	12,500
General operating:	12,500
One-time equipment cost:	5,000
Marketing	2,500
Educational development and travel:	2,500
New facility renovation?	(50,000)
Total Estimated Expenditures 1999:	\$ 35,000

Table 10. RPDL-NDS Income in 1999.

Sample fees:	\$ 53,654.61
Unpaid sample fees:	6,730.00
Lecture fees:	
Professional Golf Turf School	18,865.00
O.C.P.E. Short Course Coordinator	850.00
O.C.P.E. Short Course Instructor	1,375.00
Other	1,925.00
Value of no-charge samples:	< \$4,480.00 >
Total potential revenue:	\$86,639.51
Total Income:	\$ 82,159.51

Table 12. RPDL-NDS Estimated Income for 2000¹.

Estimated TURF Sample Income:	
40% @ \$50	\$ 35,000
Estimated OUT-OF-STATE Sample Income:	
20% @ \$75	26,250
Estimated ALL OTHER Sample Income:	
40% @ \$20	14,000
Estimated LECTURE FEE Income:	23,000
Total Estimated Income for 1999:	\$ 98,250

¹ based on 1750 samples submitted in 2000.

Appendix II. Complete Listing of Lectures Presented During 1999.

Richard J. Buckley, Laboratory Coordinator, Plant Diagnostic Laboratory

Date	Title of Presentation	Audience	Location	Number of handouts	Type of participants*
1-3/99	Diseases of Turfgrass (10 Lectures)	Professional Golf Turf Management School	Cook College	20	T
1-3/99	Diseases of Ornamentals (10 Lectures)	Professional Golf Turf Management School	Cook College	20	T
1-3/99	Principles of Pest Management on the Golf Course (10 Lectures)	Professional Golf Turf Management School	Cook College	20	T
1-3/99	Weed Identification (10 Lectures)	Professional Golf Turf Management School	Cook College	20	T
1-3/99	Insects of Turfgrass (10 Lectures)	Professional Golf Turf Management School	Cook College	20	T
1/6/99	Diagnosing Abiotic Influences on Trees	North Jersey Ornamental Horticulture Conference	Morris Co.	3	A,I,T,L
1/7/99	Key Pests of Small Trees and Shrubs	North Jersey Ornamental Horticulture Conference	Morris Co.	2	A,I,T,L
1/8/99	Basic Turf Diseases: Pick Your Best Defense	North Jersey Ornamental Horticulture Conference	Morris Co.	2	A,I,T,L
1/11/99	Abiotic Disorders that Lead to Pest and Disease Problems	Lawn Doctor National Conference	Atlantic Co.	1	L,T
1/21/99	Intro to Turf Diseases: Part 1	3 Week Turf School	Cook College	2	T
1/22/99	Intro to Turf Diseases: Part 2	3 Week Turf School	Cook College	2	T
1/27/99	Problem Insects and Pesticide Use	Professional Parks Maintenance	Cook College	3	A,T,L
2/2/99	Turfgrass Insect Pests: ID, Monitoring, and Control	Landscape IPM Short Course	Cook College	3	T,L
2/2/99	Diagnosing Ornamental Plant Disorders	Landscape IPM Short Course	Cook College	3	T,L
2/3/99	Troubleshooting Turf Disorders	Reed and Perrine Turf Seminar	Monmouth Co.	2	T,L
2/10/99	Troubleshooting Turf Disorders	Advanced Topics in Professional Grounds Maintenance: Turf Disease Short Course	Cook College	1	T,L
2/10/99	Selection and Use of Fungicides on Turfgrass	Advanced Topics in Professional Grounds Maintenance: Turf Disease Short Course	Cook College	4	T,L
2/16/99	Common Turf Diseases: Pick Your Best Defense	Jonathan Green Turf Care Seminar	Monmouth Co.	4	I,T,J
2/22/99	Turf Insect Pests: Beetles and Grubs	Fine and Sports Turf (11:776:451)	Cook College	2	C
2/24/99	Plant Diagnostic Lab Update: Insect Stress '98	Bergen County Landscape Contractors Assoc. Annual Conf.	Hudson Co.	2	A,I,L,T
2/24/99	Turf Disease Problems and Their Control	Athletic Field Construction Short Course	Cook College	3	L,T
2/25/99	Turf Insect Pests: Bugs and Moths	Fine and Sports Turf (11:776:451)	Cook College	2	C
3/2/99	Effective Use of the Plant Diagnostic Laboratory	Introduction to Golf Turf Management Short Course	Cook College	2	T
3/10/99	Key Pests of New Jersey	Horticultural Topics (00:000:000)	Cook College	2	C
3/18/99	IPM Strategies for Insect and Diseases	NJ International Society of Arboriculture	Middlesex Co.	2	A
3/20/99	Spring Turf Diseases	Home Gardeners School	Cook College	3	H
4/8/99	Diagnosing Plant Problems	Master Gardener Training	Monmouth Co.	3	H
4/15/99	Diagnosing Plant Problems	Master Gardener Training	Ocean Co.	3	H
4/22/99	Greenhouse Disorders	Greenhouse Environmental Management (00:000:000)	Cook College	1	C
5/1/99	Diseases of NJ Christmas Trees	Christmas Tree Growers Short Course	Cook College	3	A,L
5/7/99	Tree Diseases and Plant Health Care	Certified Tree Expert Training Program	Monmouth Co.	5	A,L
6/15/99	Effective Use of the Plant Diagnostic Laboratory	Novartis Regional Sales Meeting	Morris Co.	1	N
9/27/99	Drought Stress and Turf Disease	Penn State Northeast Region Fall Turfgrass Seminar	Lehigh, PA	3	L,T
11/4/99	Plant Pathology and Disease Diagnostic Concepts	Master Gardener Training	Hunterdon Co.	1	H
11/5/99	Plant Disease Diagnosis	Master Gardener Training	Middlesex Co.	1	H
11/14/99	Diagnosing Turf Problems	Professional Lawn Care Association of America Annual Conf.	Baltimore, MD	1	I,L,T
11/18/99	Basic Plant Pathology and Disease Diagnostic Concepts	Master Gardener Training	Mercer Co.	1	H
12/7/99	Ornamental Pest Management	New Jersey Turf Expo	Atlantic Co.	2	I,L,T
12/9/99	Basic Turf Diseases: Pick Your Defense	New Jersey Turf Expo	Atlantic Co.	2	I,L,T
12/15/99	Plant Pest Diagnosis	Master Gardener Training	Essex Co.	1	H
10-12/99	Weed Identification (10 Lectures)	Professional Golf Turf Management School	Cook College	20	T
10-12/99	Principles of Pest Control on the Golf Course (10 Lectures)	Professional Golf Turf Management School	Cook College	20	T
10-12/99	Diseases of Turfgrass (10 Lectures)	Professional Golf Turf Management School	Cook College	20	T
10-12/99	Diseases of Ornamentals (10 Lectures)	Professional Golf Turf Management School	Cook College	20	T
10-12/99	Insects of Turfgrass (10 Lectures)	Professional Golf Turf Management School	Cook College	20	T

*Audience Addressed: A=Arborist; C=College (Academic); G=Greenhouse; H=Residential Clientele; I=Industry; L=Landscape Professionals; N=Nursery Growers; T=Turfgrass Managers; X=Christmas Tree Growers.

Clare S. Liptak, Horticultural Consultant, Plant Diagnostic Laboratory


Appendix III. Complete Listing of Lectures Presented During 1999.

Clare S. Liptak, Horticultural Consultant, Plant Diagnostic Laboratory

Date	Title of Presentation	Audience	Location	Number of handouts	Type of participants ¹
2/10/99	Marketing IPM Services	Landscape IPM Short Course	Cook College	1	H
3/20/99	Invite Good Bugs to Your Yard!	Home Gardeners School	Cook College	1	H
5/3/99	Testing and Diagnostic Services at Rutgers	Master Gardener Training	Cook College	3	H
9/18/99	Plant Identification Techniques	Home Gardeners School	Cook College	1	H
10/22/99	Botany for Gardeners	Master Gardener Training	Union Co.	1	H
12/1/99	Testing and Diagnostic Services at Rutgers	South Jersey Landscaper Conference	Gloucester Co.	3	A,L,T

Audience Addressed: A = Arborist; C = College (Academic); G = Greenhouse; H = Residential Clientele; I = Industry; L = Landscape Professionals; N = Nursery Growers; T = Turfgrass Managers; X = Christmas Tree Growers.

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