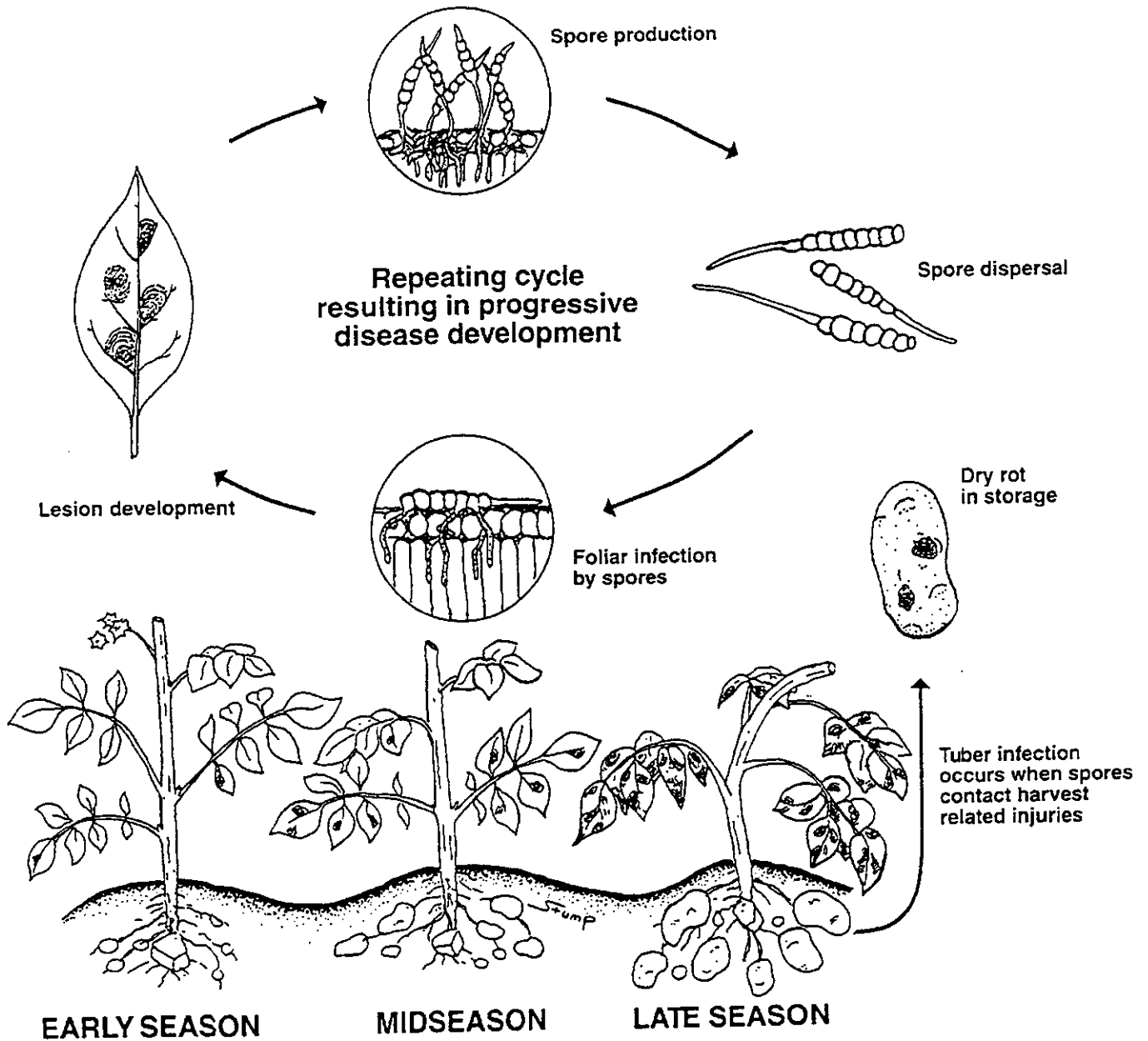




March 2000  
Volume 21, Number 1

# Plant Diagnostics Quarterly

Features: *Plant Diagnostics - The Private Side*  
*Tree Pathology and Related Reference Books*



### **On the Cover:**

This issue of PDQ features the Potato Early Blight Disease cycle, which is a disease caused by the fungus *Alternaria solani*. "Spore production and spore dispersal results in the progressive foliar development. Spores dislodged from foliar lesions also contaminate the soil surface. Spores from contaminated soil and/or infected foliage infect tubers and decay develops during storage (prepared by W. L. Stump and G. D. Franc). Reproduced with permission from the University of Wyoming's factsheet #B-997, May 1994, Potato Early Blight.

Cover Art was graciously supplied by Dr. William Stump from the University of Wyoming. He has been doing scientific illustration since the early eighties with subjects that encompass plant pathology, botany, and entomology. Though a full-time research scientist in plant pathology, he is willing to undertake projects for a reasonable fee. He can be contacted by email: [wstump@uwyo.edu](mailto:wstump@uwyo.edu)

Plant Diagnostics Quarterly (PDQ) is a nonprofit publication which serves plant pathologists in extension, regulatory and industrial clinical laboratories, private consultants, and other interested persons. PDQ is published four times a year.

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**Send manuscripts, announcements, and letters to the Editor:** Stephan Briere, University of Wyoming, P.O. Box 3354, Laramie, WY 82071-3354.

## FROM THE EDITOR

Dear PDQ Readers:

This is the first issue of the new millenium....I just had to say it! This issue has been difficult to put together. Everyone, including me, has been swamped when traditionally this is a time where sample work has slowed down. I guess the nature of diagnostics has changed somewhat over the years. There is a definite focus on providing educational efforts during this slower period. In my case I do a considerable amount of applied research throughout the year and use the slower sample period to undertake more greenhouse and in vitro work.

There are two features for this issue, the first is entitled "Plant Diagnostics - The Private Side" by Larry Stowell. He details his struggles to get a private diagnostic lab established. He has many insights to share about the private side of our trade.

The second feature is entitled "Tree Pathology and Related Reference Books" by Linda Haugen. Linda put together a fine article on Dutch Elm disease last year and I was able to coax here into putting together a list of references that would be valuable for anyone doing tree diagnostics.

The artwork for volume 21 of PDQ is being donated my William Stump who is a colleague of mine here at the University of Wyoming. He has done artwork for factsheets, disease compendia, and cover art for various reports. He has something special planned for the December issue of PDQ.

I would also like to announce that I will be ending my editorship of this publication with the December 2000 issue. If there is anyone out there brave enough to take over as editor of this fine publication, please feel free to contact me directly by email.

Best wishes,



Stephan Briere, Editor  
briere@uwyo.edu

# Plant Diagnostics Quarterly

March 2000

Volume 21, Number 1

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Enclosure:

- Martin Microscope Company. October 1, 1999. New MM99 Universal Microscope Adapter.

**PDQ – Plant Diagnostics Quarterly**

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**Guidelines to Contributors**

**Submission of articles:**

Articles may be submitted in any of the following manners:

- 1) As a “document” or “note” attached to an email message. Send these articles to Stephan Briere at [briere@uwyo.edu](mailto:briere@uwyo.edu). I use Microsoft Word 97 but can accept documents from earlier versions of Microsoft Word or WordPerfect versions 5.1 or higher.
- 2) As a diskette (3.5”) with PC formatting if possible.

Mail to:

Stephan Briere  
 University of Wyoming  
 P.O. Box 3354  
 Laramie, WY 82071-3354

Please include a hardcopy of the article with the disk. Disks will be returned.

- 3) As a camera-ready hardcopy. Follow the manuscript guidelines shown below. Mail to Stephan Briere at the above address.

Information for the classified section (including job announcements and workshops) can be submitted in any of the above manners or as an email message.

**Manuscript Format:**

**Titles:** Center in Boldface; Author(s) and institution(s) should be centered below the title.

**Margins:** 1 inch (Top, Bottom, Left, Right)

**Page Numbers:** Do not include (although you may lightly pencil page numbers on any hardcopies that are sent)

**Font:** Something easy to read, such as Times New Roman, 12 point

**Spacing:** Single-spaced

**Latin binomials:** Italicized

**References:** Cite at the end of the article using a consistent format, such as that used in Plant Disease.

**Printing:** If sending a hardcopy, laser printed articles are preferred; type needs to be clear and dark enough to be reproduced well.

**Enclosures:**

Send 200 copies of fact sheets to be used as enclosures in the PDQ to:

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If you are unable to supply 200 copies, send a few to Gail Ruhl (at the above address) and request that they be duplicated. Fact sheets with pictures that are to be copied **must** be of adequate quality to enable good reproduction of the photographs.

**PDQ Deadline Dates For 1999**

<b>ISSUE:</b>	<b>MARCH</b>	<b>JUNE</b>	<b>SEPTEMBER</b>	<b>DECEMBER</b>
Copy Due*:	2/19/2000	5/21/2000	8/20/2000	11/19/2000
Printing Date:	3/12/2000	6/11/2000	9/10/2000	12/10/2000

\* - Date by which all information **must be received**.

## NEWS & VIEWS

[This is a new section devoted to readership comments about recent news, events, moves, job opportunities or just to get a topic out in the open for discussion. Please e-mail me ([briere@uwoyo.edu](mailto:briere@uwoyo.edu)) any items you would like posted to this section, thanks.]

The Systematic Botany and Mycology Laboratory has initiated a project on the systematics of the genus *Diaporthe* and its asexual state *Phomopsis* with emphasis on those that cause plant diseases. Preliminary results suggest that the species of *Phomopsis* as currently circumscribed based primarily on host are not tenable (Rehner, S.A. & F.A. Uecker, 1994. Nuclear ribosomal internal transcribed spacer phylogeny and host diversity in the coelomycete *Phomopsis*. *Canad. J. Bot.* 72: 1666-1674). However, some taxa in *Phomopsis* are limited to specific hosts and these can be described and differentiated from other *Phomopsis* isolated from the same host based on both morphological and cultural characteristics. An account of one example, *Phomopsis amygdali* was recently published (Farr, D.F. et al., 1999. *Phomopsis amygdali* causes peach shoot blight of cultivated peach trees in the southeastern United States. *Mycologia* 91: 1008-1015) and another describing species of *Phomopsis* on blueberries is in progress.

In order to understand this large and important group of fungi, we are asking that plant pathologists and diagnosticians send isolates of *Phomopsis* from known hosts to us for use in this study. If you have such isolates, please send them along with as much information as possible about host, pathogenicity, growing conditions, etc. to:

Dr. Amy Rossman, Research Leader  
Systematic Botany and Mycology Laboratory  
Rm. 304, B011A,  
10300 Baltimore Ave., Beltsville, MD 20705,

(tel) 301-504-5364,  
(email) [amy@nt.ars-grin.gov](mailto:amy@nt.ars-grin.gov)

Your assistance in understanding this difficult group of fungi will be appreciated!

## REGIONAL REPORTS

### NORTHEAST

**Cheryl Smith**

The lack of snow was the big topic early this winter, but that situation was alleviated in late January with several heavy snowfalls. The Northeast experienced a couple of severe cold spells with high winds, so we can expect to see some winter injury as a result. Most of us are in 'our slow period', but that's not the case with Rich Buckley in New Jersey. He reported that they are receiving more and more samples all the time. They are at twice the volume compared to this time last year. I guess that's one way to fight the winter doldrums.

#### Woody Ornamentals

##### Delaware - Bob Mulrooney

Bob continued to receive samples of branch die-back on many hosts caused by *Botryosphaeria* (most likely due to drought stress). He reported another dry weather-favored disease on several samples of Japanese black pine: pine wilt caused by the pinewood nematode *Bursaphelenchus*.

##### Maryland - Ethel Dutky

Ethel received a variety of *Hydrangea macrophylla* cultivars with varying degrees of powdery mildew, some were very damaged, others only slightly so. Other samples diagnosed included root knot nematode on boxwood (*Meloidogyne sp.*), web blight (*Rhizoctonia solani*) on the shoots of a dwarf

*Chamaecyparis*, Phomopsis canker on *Pieris japonica* and Fusarium canker on hemlock.

##### New York - Karen L. Snover

Karen reported Phytophthora root rot on rhododendron, purple beech, and holly. As most of us in the Northeast, she also received many woody plants showing heat and drought stress symptoms. Other samples diagnosed by Karen included Phytophthora leaf spot on rhododendron, Rhizosphaera needle blight on Colorado blue spruce, potassium deficiency on Siberian spruce and blue spruce, Rhizoctonia root rot on hydrangea, white pine blister rust on *Ribes* and tar spot on Norway maple

##### Massachusetts - Dan Gillman & Susan Lerner

Dan and Susan continue to receive drought-related samples, (i.e., "no or minimal evidence of biotic disease or insect involvement in causing leaf/needle browning, branch die back and/or the death of entire trees that were transplanted in the last 3-5 years). Mature white pines continue to exhibit stunted growth (both needles and shot elongation) going seven years back. Sugar and red maple have produced much smaller than normal leaves, then developed premature fall color and leaf loss.

They also reported a case of Macrophomina phaseolina (charcoal root rot) on *Abies concolor* from a nursery and mentioned that it was a "good possibility that the seedling came in from a nursery located in a warmer region of the country". Other samples received included Fusarium pitch canker on white pine, Diplodia



(*Sphaeropsis*) on Swiss stone pine, *Rhizosphaera* needle cast on Norway spruce, *Verticillium* wilt on Japanese maple and Swiss needle cast on Douglas fir.

#### New Hampshire - Cheryl Smith

The following samples were received in the UNH-PDL; squirrel injury (chewing shoots) on spruce, needle loss on balsam fir due to drought stress), *Phomopsis* needle blight on spruce, *Phytophthora* root rot on andromeda, *Sphaeropsis* (and possibly *Scleroderris*) on red pine, and *Rhizosphaera* on spruce.

#### New Jersey - Rich Buckley

As for landscape specimens, Rich can only say "drought, drought, drought". They did see some borer and canker problems (mostly flat-headed borers in deciduous trees and *Cytospora* or *Botryosphaeria* for cankers), which made things a little more interesting for them.

#### Pennsylvania - John Peplinski

The largest chunk of John's samples were wood decay problems. Shade trees with woody decay fungi included: *Inonotus dryadeus* root rot of pin oak, a couple red oak specimens with *Grifola frondosa*, *Ganoderma applanatum* on pin oak, *Spongipellis* wood decay of American beech, *Flammulina* white spongy trunk rot on *Liriodendron*, and *Ustulina deusta* on Japanese red maple. The only other samples reported were an *Ilex crenata* specimen with *Thielaviopsis* root rot and a Pin oak sample from southeastern PA tested positive for *Xylella fastidiosa*.

#### **Herbaceous Ornamentals & Greenhouse**

##### Delaware - Bob Mulrooney

Bob identified INSV by symptoms on holiday cactus, but he could not get a positive ELISA test after three attempts. He mentioned he was told this is common on this host. He'd welcome comments from anyone who has experience with INSV on this host. Bob was also excited about a 'great' sample of *Fusarium* wilt on cyclamen. The discoloration in the corm was typical with lots of bacteria associated with the decay. The disease was causing stunting and yellowing on scattered plants on the bench. This was a first for this disease for Bob.

#### Maryland - Ethel Dutky

Nematode problems included foliar nematode on Japanese Anemone and root knot nematode (*Meloidogyne incognita*) on daylily. Crown gall was identified on *Achillea* and Crane's-bill geranium. Other samples included *Cercospora* leaf spot, and *Alternaria* leaf spot on pansy, powdery mildew on verbena and poinsettia, and bacterial leaf spot was diagnosed on English ivy.

#### New York - Karen L. Snover

Karen received a Siberian Iris from a breeder who suspected a bacterial infection which was described in the literature as Bacterial Scorch in the 1950s. She has two isolates of a *Pseudomonas fluorescens* which they will use to begin conducting pathogenicity studies. Other diseases reported by Karen were bacterial blight on geranium, iron deficiency on Gerbera daisy, *Fusarium* stem canker on Delphinium, white rust on Powell amaranth and chlorine bleach injury on poinsettia.

#### New Hampshire - Cheryl Smith

Cheryl reported the following samples; powdery mildew on Artillery fern (*Pilea*),

Pythium root rot on Million Bells (*Calibrachoa*) 'cherry pink' and 'terra-cotta', INSV on double rosebud impatiens 'purple magic' and Pythium root rot on geraniums and poinsettia.

#### Pennsylvania - John Peplinski

The samples that John reported were a Chinese hibiscus with Thielaviopsis root rot, Ranunculus with INSV and a geranium with severe rust (*Puccinia pelargonii-zonalis*).

#### **Turf**

##### Massachusetts - Gail Schumann

Gail reported the following: "This fall was another unusually late, warm and snowless one. In November and December, some cool weather diseases were active including take-all patch, anthracnose, and Fusarium patch (pink snow mold). The most common (and confusing) complaint was PCNB phytotoxicity. A number of superintendents thought that they might be having a leaf spot outbreak. The warm weather seemed to enhance this common reaction on bentgrass. It was clearly phytotoxicity because of the sharp demarcation between the affected leaf tips and the healthy bases, the uniform effect across the turf, and the reaction of the bentgrass with little reaction in the *Poa annua*. Because of the strange weather, samples continued to arrive until mid-January when snow finally covered the turf.

##### New Jersey - Rich Buckley

Rich reported seeing the obligatory yellow patch and pink snow mold samples in the fall. Once (the superintendents) get the PCNB down in mid-December for the snow molds, the samples slow down considerably from the golf courses. Dollar spot was pretty active during October and November (they had a pretty warm

fall/early winter so the disease pressure was high). In one case, a superintendent who had used Banner for dollar spot control for several years had difficulty controlling the disease. Rich was able to get the fungus to grow on media amended with 100ppm of the material ("Guess he wasn't getting too much control!"). They had him switch to vinclozalin and it cleaned everything up nicely. Since mid-January they have had about 20 days of snow cover, so they may even get some gray snow mold this year!

##### New York - Karen L. Snover

Karen reported that turf samples the past few months were submitted with the following diseases; summer patch, brown patch, anthracnose, Curvularia leaf blight, Leptosphaerulina leaf blight, rust, plant pathogenic nematodes, drought stress and an abundance of Algae present from the heavy rain after hurricane Floyd.

#### **Vegetables**

##### Delaware - Bob Mulrooney

Bob reported seeing an outbreak of common blight on late planted snap beans after the heavy rains from hurricane Floyd in September. He also mentioned that downy mildew, caused by *Phytophthora phaseoli*, was very prevalent on late planted baby lima beans along with white mold. The ideal weather conditions made the two diseases a serious problem for processors.

##### Maryland - Ethel Dutky

Ethel had one case to report of an eriophyid mite (*Eryophes tulipae*) on garlic. She thought it was interesting since this particular mite also feeds on grasses, including small grains and corn, where it is a virus vector. It also affects

wild onion and other bulbs where it causes sunken tan blotches wherever it feeds on bulb surfaces between the scales.

#### New York - Karen L. Snover

Fusarium wilt was diagnosed by Karen on muskmelon, winter squash, honeydew, cantaloupe, watermelon and pepper. Cucurbit problems included bacterial wilt on honeydew and zucchini, Phytophthora rot on baby 'Pam' pumpkins and powdery mildew on pumpkin. Other diseases reported were Alternaria leaf spot on cabbage, barley yellow dwarf virus on sweet corn, Fusarium dry rot on potatoes and powdery mildew on lettuce.

#### Pennsylvania - John Peplinski

All of the vegetable problems John reported were on potatoes. Pink rot (*Phytophthora sp.*) developed on potato tubers in storage. They believe the wet field conditions late in the growing season promoted this disease. Jelly end rot of potato was prevalent in areas where drought was followed by adequate soil moisture that encouraged secondary growth of tubers. Early blight lesions (*Alternaria*) were found on a potato tuber sample.

#### New Hampshire - Cheryl Smith

Two tomato samples were reported by Cheryl; *Alternaria* fruit rot on tomatoes grown in a high tunnel and *Sclerotinia* stem canker on tomatoes grown in a home greenhouse (one attached to the house). The bed that the tomatoes were grown in was filled with field soil.

#### **Fruit**

Bob Mulrooney (DE) said that gray mold was rampant on fall harvested 'Heritage' red

raspberries in home gardens after the rain and cool weather in September. Karen Snover (NY) reported Red Raspberry with *Phytophthora* Root Rot and Apple with Bitter Pit.

#### **Field Crops**

Bob Mulrooney (DE) reported that charcoal rot continued to be identified in many soybean fields as harvest got underway last fall. Pod and stem blight and anthracnose were very common as plants dried down. Stem canker (with very visible cankers) was seen sporadically. Soybean cyst nematode was also identified from soil samples taken from fields with low yields. Karen Snover (NY) reported an unusual case...a sample of white clover with a form of *Rhizoctonia* that causes 'Slobbers' in Horses. The salivation of the horses can get so bad, the horse owner told her, that they can fill up a feed bucket in the time it takes to prepare their dinner. The slobbers comes on very quickly when the horses are released into the pasture and can stop just as quickly when restricted from that area. John Peplinski (PA) said they received a haylage feed sample thoroughly colonized with *Penicillium* and *Monascus*.

## **SOUTHEAST**

### **Jackie Mullen**

Our winter months were relatively mild. In the southern sections of this region, most night temperatures did not drop much below the mid 20's or lower 30's F range. Many nights were above freezing. As is usual for this time of year, our reports of noteworthy diseases are reduced.. With the exception of southern sections, many disease diagnoses occurred on greenhouse and nursery crops.

### Field Crops/Forages

Stephan Vann in Arkansas reported the initial appearance of leaf rust (*Puccinia*) on wheat in the southwestern part of the state. Historically both leaf rust and leaf blotch are usually seen first in this area of the state. As of late February, *Septoria tritici* was observed only on the lowest leaves.

In Alabama, Jackie Mullen observed *Sclerotinia* sp. as a lower stem/crown rot on forage 'Austin' peas.

### Fruits and Nuts

Meg Williamson, at Clemson in South Carolina, reported seeing commercial strawberries with *Phytophthora* crown and root rots.

In Alabama, *Xanthomonas* sp. leaf spot was noted on strawberry in the Mobile/Baldwin County area. *Botryosphaeria* cankers were observed on branches of apple, peach, and blackberries. *Phomopsis* canker was also diagnosed on peach.

### Vegetables

In Arkansas, several turnip samples with *Cercospora* leaf spot were diagnosed. This disease is common during winter months and also occurs on mustard greens as well. Spots are most numerous on the lower leaves and are often observed with a yellow halo around necrotic areas.

Gray mold (*Botrytis* sp.) was noted on several trays of greenhouse bell pepper seedlings. The fungus produced damping-off symptoms on the young plants. Sporulation was abundant on the stems and leaves.

In South Carolina, Meg noted sweet potato tubers with Rhizopus rot and a high population of spiral nematodes in accompanying soil. After the first hard frost, which followed some very mild weather, they received samples of broccoli and collards with cold damage. White spot (*Cercospora brassicae*) was diagnosed on one sample of turnip. Samples of both cabbage and broccoli from the same grower had stem galls which were suspect to be from 2,4-D damage. *Alternaria* leaf spots were also present.

Alabama diseases included a *Botrytis* stem rot on greenhouse-grown basil. Also, *Pythium* root rot on greenhouse rosemary seedlings and bacterial speck on greenhouse tomato seedlings was observed.

### Ornamentals

Steve Vann (AR) reported an early occurrence of hawthorn stem canker-gall with what appeared to be *Gymnosporangium* sp. aecial structures with aeciospores.

In Kentucky, Julie Beale reported numerous conifer samples, especially spruces, with needle browning and defoliation from drought damage. Also, she noted more pine wilt from pinewood nematode than seen previously. Hosts seen were Japanese black, Scots, and Austrian pines. She also reported several samples of greenhouse tomatoes and New Guinea impatiens with ethylene damage as a result of faulty heating/ventilation systems.

In South Carolina, Meg Williamson reported commercial and landscape problems. A coleus with impatiens necrotic spot virus (INSV) showed symptoms of necrotic nodes and some leaf necrosis.

Two submissions of shamrock (*Oxalis*) with what appears to be shamrock chlorotic ringspot potyvirus were received. Clemson virologist, Simon Scott, will try to purify the virus particles, if he can get additional plants from the grower. Other commercial submissions included Pythium root rot on scabiosa 'Blue Butterfly', a dianthus 'Bath's Pink' with Fusarium root and crown rot, a New Guinea impatiens with Pythium root and stem rot, and an oenothera with Botrytis blight. A nursery submission of Leyland cypress had Phytophthora root rot. From landscapes, a mondo grass with Pythium root rot was submitted. It appears the problem started with fertilizer burn. A needle palm (*Rhapidophyllum* sp.) with lichenized algal leaf spot was something not seen before. There were several samples of Leyland cypress with Botryosphaeria canker and dieback and one with Seiridium canker. Botryosphaeria canker was also diagnosed on wax myrtle. Septoria leaf spot was diagnosed on wax myrtle and azalea. Alternaria leaf spot with a soil pH of 4.4 was noted as the cause for damage on a Pittosporum.

South Carolina golf course diseases included several samples with Leptosphaerulina leaf blight. One samples submitted also had a high population of ring nematodes. In a sample from another course, poor soil nutrient levels were combined with pH readings of 4.1 in one sample and 4.2 in another. In the home turf arena, the only true disease encountered was rust on a zoysia sample.

Alabama samples of *Botrytis* and *Pythium* were most common. Botrytis blight was noted on greenhouse samples of marigold, begonia, and New Guinea impatiens. Also, *Botrytis* sp. was observed as an apparent (possible

secondary) needle blight on Leyland cypress. *Pythium* sp. was noted as a root rot of nursery *Leucothoe* and on greenhouse *Pentas* and begonia. *Cercospora* spp. were seen on landscape azalea and Indian hawthorn. A bacterial leaf spot was observed on greenhouse *Pentas*. Impatiens necrotic spot virus was confirmed on greenhouse New Guinea impatiens by using Agdia's ELISA kit. In February, as spring like temperatures of 60-70 F began to become a common occurrence, many samples of evergreen landscape diebacks began to arrive at our clinic. Biotic disease was not present, and we assume that fall-winter drought damage is responsible for the widespread problem.

Much of the turf grass in Alabama did not go dormant until January, so brown patch and take-all patch continued to be diagnosed during December on centipede and St. Augustine / zoysia, respectively. Fescue samples with Drechslera leaf spot and Pythium blight were noted. Pythium root rot was diagnosed on Paspalum, which is used as a ground cover-turf in some areas of southern AL.

Our final note from AL is that a new Auburn University Alabama Cooperative Extension System Plant Diagnostic Lab opened at the Birmingham Botanical Gardens in February. Dr. Jim Jacobi is our new Plant Pathologist. He has been on the job since February 1! This new clinic will predominantly service the greater Birmingham area, which includes Jefferson County and all neighboring counties. We are very pleased to have Jim with us and his previous experience in ornamentals and pesticide work will serve him well with his new responsibilities!

## CENTRAL

### Brian Hudelson

Activity at the clinics in the north central region has been slow during the past quarter, with only four states (Illinois, Iowa, Minnesota and Wisconsin) reporting this quarter.

Several clinicians [Nancy Pataky (IL), Paula Flynn (IA), Sandee Gould (MN)] mentioned processing samples for nematodes and recovering soybean cyst nematode (IA, IL), dagger nematode (IL) and needle nematode (IL). Pine wilt nematode was also mentioned in both Illinois and Minnesota. Sandee Gould (MN) mentioned processing large numbers of corn and wheat samples for grain storage mold. Brian Hudelson (WI) has evaluated several soil samples for *Aphanomyces* and has had potato tubers with disease problems such as pink eye, soft rot, silver scurf and black heart.

On landscape plants, *Rhizosphaera* needle blight and *Cytospora* canker of spruce were mentioned (IL, IA, WI) as were *Dothistroma* needle blight of Austrian and Scots pine (IA, WI), *Sphaeropsis* tip blight of Austrian and white pine (IA, WI). One sample of *Cyclaneusma* needle blight was reported in Wisconsin, as well as crown gall on a crabapple root sample. Sandee Gould (MN) also mentioned *Phytophthora* stem decline and *Rhizoctonia* root rot on lilac, *Phytophthora* root rot of *Lamium*, and *Pythium* root rot of *impatiens* and *Primula*.

Among indoor/greenhouse plants, viral diseases were most commonly mentioned. These included pelargonium flower break virus (IA), *impatiens* necrotic spot virus on salvia, fuchsia, *impatiens* and coleus (MN), and

tobacco streak virus on *Anthurium*.

Anthracnose showed up on orchids in both Minnesota and Wisconsin. Root and stem rots showed up in Wisconsin (*Phytophthora* root rot on orchids and *Pythium* root rot on poinsettia) and Illinois (*Pythium* stem rot on geranium cuttings). In addition, Brian Hudelson (WI) reported anthracnose on azalea and *Xanthomonas* leaf spot on English ivy.

Finally, Brian Hudelson mentioned an unusual sample of grass sweepings that had been fed to young cattle that had subsequently died. The sweepings were full of ergot sclerotia.

## SOUTHWEST

### Tom Isakeit

#### Arizona - Mike Matheron (Yuma)

We are in the peak of the winter vegetable season in southwestern Arizona. Our normal rainfall in the winter is sparse compared to other areas of the U.S. However, it has been abnormally dry even for a desert, with no rainfall since September 23. This environment has reduced but not totally eliminated downy mildew, which has appeared in some spinach fields and an occasional cabbage and broccoli field. The incidence of lettuce leaf drop caused by *Sclerotinia minor* has been higher than in previous seasons. Some crown rot on small lettuce plants was caused by a *Pythium* sp. Powdery mildew on lettuce, caused by *Erysiphe cichoracearum*, is now increasing rapidly and will plague growers until the last fields are harvested in early April.

**Arizona - Mary Olsen (Tucson)**

We are having a historically dry winter, so little has been happening lately. However, in central Arizona we had more than the usual cotton (*Phymatotrichopsis*) root rot in the fall. I am attributing its late arrival to a relatively cool, wet summer and very warm, dry fall. Plants probably were just not stressed enough to go down until it dried out. Disease occurred on susceptible trees such as African Sumac, elm, and bottletree. Another root rot on mature trees and shrubs, Ganoderma, is also showing up more. We got samples of declining or dying Carob, willow and pomegranate with fruiting bodies. Powdery mildew showed up on mesquite this fall; it is a *Leveillula* sp. An unusually severe infection of turf by *Leptosphaerulina trifolii* showed up from the Phoenix area.

**California, Imperial Valley - Tom Turini**

It has been a warm fall season in the low desert. This fall, *Monosporascus cannonballus* caused vine decline in large sections of several cantaloupe fields in Imperial County. There was high incidence of charcoal rot on cantaloupes in a *Monosporascus* vine decline experiment at the Desert Research and Extension Center this summer (over 50% of the vines were affected in some plots), but it was not a problem in the fall experiment. In commercial fields, no more than 6% of the plants had charcoal rot and there was little foliar damage due to this problem. An inter-veinal chlorosis is common on the older leaves on cantaloupes this season. Leaves with these symptoms were tested for Cucurbit Yellow Stunt Disorder Virus, as well as the viruses known to occur in this area. Due to the wide distribution of these symptoms, it is unlikely it is nutritional. This is being investigated further.

In September, there was been an isolated incidence of black rot in a greenhouse in the low desert, but the plants were destroyed and the disease has not been seen in this area since that outbreak. Bacterial leaf blotch of sudangrass, which is caused by *Pantoea ananas* and *P. stewartii*, is in every sudangrass field I have seen this season.

**California, South Central Coast (Santa Maria) - Franklin Laemmlen**

Things have been very quiet, disease-wise this winter. Our weather has been very dry. Our precipitation levels are less than 50% of "normal" now in mid-Feb, which means we have about 3 1/2 to 4 inches and we should have 7 to 8, by now. As a result diseases are not very active. We have had some downy mildew in spinach and stocks - not unexpected, and some rust in artemia (a field-grown cut flower), but no pin /bead rot in broccoli so far this winter. Sclerotinia incidence in cabbage and lettuce is also very low. Field work has not been interrupted by rain, so bed preparation and seeding or transplanting has proceeded right on schedule. This state of events does not bode well for the price situation, as the pipelines will be continuously full of produce into the short distance future and prices will remain low.

**California, San Diego County - Pat Nolan**

I'm getting the usual number of samples, but very few have a real disease, in part due to the second year of La Nina drought conditions. The Mexican fruit fly quarantine continues. Avocado growers received a big set back in getting their fruit to market when USDA research determined that methyl bromide fumigation does not kill Mexican fruit fly without using levels high enough to also damage

the fruit. That left one alternative, spraying with Malathion or Spinosad. All are scrambling to get the appropriate permits and get the chemicals on in time. Work continues to find some way to compensate the exotic fruit growers for total loss of their crops.

### **New Mexico - Natalie Goldberg**

We really didn't have much in the fall, but here is a short report: The following diseases and disorders were identified in the plant clinic at New Mexico State University: *Pythium* sp. on spinach; root knot nematode (*Meloidogyne incognita*), Verticillium wilt (*Verticillium dahliae*), Phytophthora root rot (*Phytophthora capsici*), Beet Curly Top Virus, Tomato Spotted Wilt Virus, and Alfalfa Mosaic Virus on chile peppers; Beet Curly Top Virus on tomatoes; common blight (*Xanthomonas campestris* pv. *phaseoli*) on pinto bean; anthracnose (*Colletotrichum orbiculare*) and blossom-end rot on watermelon; Soft rot (*Erwinia carotovora*) on pumpkin; Leaf anthracnose (*Colletotrichum graminicola*) and leaf blight (*Bipolaris turcica*) on sorghum; Phymatotrichum root rot (*Phymatotrichopsis omnivora*) on alfalfa, apple, and Afghan pine; Crown and root rot (*Thielaviopsis basicola*) on pansy; and Bitter pit on apple.

### **Texas - Tom Isakeit**

The fall and winter have been generally dry throughout Texas. At this time of the year, the disease "action" is in the southern part of the state. In the Lower Rio Grande Valley, sorghum ergot (*Claviceps africana*) was prevalent in sorghum that flowered in December. Gary Odvody reported that ergot was present in February in volunteer sorghum in the Corpus Christi area. Erik Mirkov reported that in

February, volunteer squash with symptoms of the cucurbit yellow stunt disorder virus were found at the Weslaco station. The presence of this virus during the planting and establishment of the spring cantaloupe crop is not a good thing. Andreas Westphal isolated a fluorescent Pseudomonad from necrotic lesions on watermelon transplants from a greenhouse in south Texas. However, my preliminary pathogenicity tests on watermelon seedlings indicate that this species is not as pathogenic as *Acidovorax avenae* subsp. *citrulli*. Late blight of potato was reported in mid-February in the Lower Rio Grande Valley. The severity appears to be light, coinciding with hot, dry conditions. Potato growers were frustrated that the EPA did not grant a section 18 on their favorite fungicide, Tattoo C. Mark Black reported beet curly top virus in spinach grown in the Winter Garden area.

## **PACIFIC NORTHWEST AND ROCKY MOUNTAINS Cheryl Ruby**

### **Washington**

#### **Lindsey du Toit, Plant**

#### **Pathologist/Diagnostician**

Late fall and winter in western WA have been pretty mild – typical cold, cloudy, and wet weather was interspersed with more sunny days than normal. Fewer complaints of sunshine deficit disorder?!? Some of the plant diseases/problems received through late fall/winter include:

#### **Trees & shrubs:**

Phomopsis canker on noble and grand firs, Armillaria root rot on several Douglas fir



samples, *Nectria* canker and *Verticillium* wilt on maples, herbicide damage to noble firs, root rot on *Sequoiadendron giganteum* from overwatering, the ever present *Entomosporium* leafspot on Photinia, and severe root-binding on a large number of transplanted arborvitae (with numerous shothole borers coming in secondarily).

#### **Groundcovers:**

Various leaf-spotting fungi on kinnikinnik.

#### **Greenhouse ornamentals, flowers & bulbs, houseplants:**

Successfully isolated *Rhodococcus fascians* (verified with fatty acid analysis) from fasciated lily bulbs (great symptom development on sweet pea seedlings inoculated with the isolated bacterium), chlorine toxicity problem on blue poppy (*Meconopsis nepaulense*) seedlings in a nursery (after a neighbor added chlorine to the water source!), and *Fusarium* wilt and *Botrytis* tip blight on *Fuchsia* and *Phygellus*. I know we are only meant to report "diseases", but an interesting "insect" sample that came in was a spider mite problem on Christmas cactus (*Schlumbergera*).

#### **Turfgrass:**

The usual red thread (*Laetisaria fuciformis*), anthracnose basal rot (*Colletotrichum graminicola*), *Fusarium* patch (*Microdochium nivale*) (home lawns, sports field, and in a creeping bentgrass seed field), and yellow patch (*Rhizoctonia cerealis*).

#### **Tree fruits:**

Brown rot (*Monilinia fructicola*) on apricot, lots of European canker (*Nectria galligena*) and anthracnose (*Cryptosporiopsis curvispora*) on

apple and pear, scab (*Venturia inaequalis*) on apple, and shothole or *Coryneum* blight (*Wilsonomyces carpophilus*) on peach.

#### **Herbs & vegetables:**

Disappearing root rot (*Cylindrocarpon*) on ginseng, cold damage to newly emerging leaves on basil plants in a greenhouse, and possible calcium or boron deficiency on hothouse rhubarb.

#### **Oregon**

**PDQ Regional Report for the Hermiston Ag. Research and Ext. Center  
(Joy Jaeger - Lab Manager, Extension Plant Pathology Laboratory)**

There were only a couple of noteworthy problems so far this winter. One potato storage had a noticeable furry brown growth on the surface of the tubers. It turned out to be *Rhizoctonia*, probably growing on the large amount of soil clinging to the tuber surface. One carrot storage had a problem with cottony white rot (*Sclerotinia sclerotiorum*). The carrots had been cut and probably the ones already having the problem were scattered around in the pile.

## DIFFUSION

**Melodie Putnam**  
Oregon State University

***Ophiosphaerella agrostis* sp. nov. and its relationship to other species of *Ophiosphaerella*.** P.H. Dernoeden *et al.* (*Plant Dis.* 83:397) recently described a new patch disease of creeping bentgrass. This paper reports studies of the identity of the causal agent using ITS1, ITS2 and 5.8s rDNA sequence analysis. A new species was described. It differs from other *Ophiosphaerella* pathogens in turfgrass (e.g. *O. herpotricha*, *O. korrae* [= *Leptosphaeria korrae*], and *O. narmari*) in its ability to infect creeping bentgrass, and that it does not produce abundant, darkly pigmented ectrotrophic hyphae on infected plant roots. There are also differences in pseudothecial diameter, numbers of ascospore septa, and ascospore length. A key to *Ophiosphaerella* species is provided. The work was done by M.P.S. Camara *et al.*, Pennsylvania State Univ., University Park, PA; and USDA, Systematic Botany and Mycology Lab., Beltsville, MD. *Mycologia* 2000, 92:317-325

**Evaluation of bedding plant varieties for resistance to *Phytophthora*.** T.J. Banko and M.A. Stefani (Hampton Roads Agric. Res. & Extn. Center, Virginia Tech, Virginia Beach, VA) evaluated over two years the ability of bedding plants to grow after exposure to inoculum of *Phytophthora nicotianae*. Plants were inoculated by adding colonized rice grains to the soilless medium in which the seedlings were raised. The plants were then planted out into raised beds and evaluated over the summer and fall; this was repeated a second year. Isolations were made from the roots of plants in one year. The paper lists those cultivars that showed resistance or tolerance to *Phytophthora* root rot as well as those cultivars that were susceptible. Performance of a particular plant genus varied with differences in species or cultivars. *J. Environ. Hort* 2000, 18:40-44.

**Characterization of *Pseudomonas viridiflava* associated with a new symptom on tomato fruit.** Researchers in Greece (D.I. Goumas, *et al.*, Plant Protection Inst. Heraklio, Crete) have described a bacterial disease of tomato fruits in outdoor commercial production. The disease often caused damage of up to 30% of the fruit. On immature fruit lesions were water-soaked, light brown spots 1-2 mm diameter. On larger fruit, the spots appeared on the upper surface, were round or elongated, superficial, and lightly sunken. The lesions became progressively larger as the fruits matured. The center of the lesion dries out, becoming progressively gray, brown to black-brown, and is surrounded by a narrow blackish margin. Under favorable conditions, the spots usually coalesced into scabby necrotic areas covering a large area of the fruit, but never covering the whole fruit. Soft rot was not observed. *Pseudomonas viridiflava* was identified as the causal agent on the basis of morphological, physiological, biochemical and pathological

characters. The disease was worse under cool and humid weather, low night temperatures, reduced illumination, and when plants were stressed. *European J. Plant Pathology* 1999, **105**:927-932.

**FEATURE ARTICLE****Plant Diagnostics – The Private Side**

**By: Larry J. Stowell, Ph.D., CPAg, CPPP**

**PACE Consulting**

**(stowell@pace-ptri.com)**

Plant diagnostic services in the private sector is a growing industry. Plant diagnostic services reach beyond the discipline of plant pathology and therefore requires knowledge of plant nutrition, soil physics, plant-agrochemical interactions, entomology, nematology, and weed science. While universities churn out students with narrow discipline-focused education, the plant diagnostic industry demands broad knowledge of all components of plant growth and development. The seemingly impossible task of personally knowing enough to diagnose and recommend solutions to plant growth problems is the one of the key factors that prevents diagnosticians from entering private practice. This article will describe my experience in establishing a successful consulting service and how the various hurdles were overcome.

**PACE Consulting:** PACE Consulting is a full service agricultural and environmental consulting business that serves the turfgrass and conventional agricultural industry. There are two Principals of the company, myself, and my wife and owner, Dr. Wendy Gelernter (entomologist). Our primary business focuses on turfgrass management for golf courses with the agricultural consulting being a small component of our services. We also act as Research Directors for the PACE Turfgrass Research Institute (PTRI), an end-user-driven applied research group with an advisory board of 28 golf course superintendents and a representative from the United States Golf Association. We provide disease, nematode, insect, and weed identification and agronomic management services.

In 1994, the PTRI received the IPM Innovators Award from the California Environmental Protection Agency, Department of Pesticide Regulation for creativity in

advancing risk-reduction techniques for pest management in turfgrass. We recently received the Distinguished Service Award from the Southern California Golf Course Superintendents Association. We currently work closely with golf course superintendent clients who manage approximately 3,000 acres of premiere golf course turf and provide disease diagnostic services to more than 300 golf courses nationwide. In addition to diagnostic and research services, we provide a subscription information service that includes a monthly newsletter and weekly faxes during the spring, summer, and fall. The combined income from all components of the business provides us with a reasonable income but not as much income as we would make if both of remained at our industry jobs. However, we have a wonderful quality of life that is difficult to assign a dollar value to.

How we got started: Following sale of Mycogen stock, I purchased several pieces of equipment that were critical to providing diagnostic services. They included a vehicle (a used Ford F-250 4x4), a 19 ft used trailer that I stripped the interior to use for a laboratory. The advantage of the travel trailer was the electrical and plumbing setup. If you shop right, a working refrigerator, stove and air conditioning are also available. For about \$2,000 you can have a fully functional laboratory shell. Add a laboratory bench, a dissecting (used \$900) and compound microscope (Zeiss \$3,500) and you are almost ready to open up shop.

In order to accept samples from out of state in California, I needed a laboratory permit that details how samples are disposed of. We currently steam sterilize all samples that we receive after the final diagnosis is made. Instead of a bench-top autoclave that will cost about \$3,000 - \$5,000, I opted for a heavy duty hot plate and a 20 quart pressure cooker for a fraction of this cost (about \$300). The large pressure cooker has greater volume compared to the bench-top autoclaves and they reach temperature and pressure faster than a bench-top autoclave. The down side is that a pressure cooker needs to be watched so that you don't blow your lab or yourself into small pieces if the pressure exceeds limits and the two safety mechanisms fail. Much of the glassware, some incubators, and laminar flow hood were purchased used. Add a computer and laser printer and you have the basics of a plant diagnostic facility.

Since our more humble beginnings in the used travel trailer, we have built two storage buildings to house field research equipment and to archive files and we remodeled a two-car garage for our office and lab. The laboratory remodel cost \$40,000 but made financial sense, compared to about \$2,000/month rental for office space at another site that would also need modifications. We opted to invest in our own property instead of renting even though the initial expense was higher. We now have a pleasant facility sized for two scientists who get along very well.

The market: In order to be successful, you will need to identify a stable market for your services. It took several years before I identified the golf course turfgrass market. I had attempted to enter the more conventional agricultural consulting market but University of California Extension Services are very effective in the California essentially excluding this market opportunity for the private sector. In areas of the country where free services are provided by university extension personnel, there may not be a solid market for plant diagnostic services. Moreover, even if extension moves out of a market, as many universities have closed their diagnostic laboratories, there may not be an immediate demand for your services. The reason is that the community has learned to expect something for nothing from free or very low cost extension services. And, I can assure you that diagnostic services are expensive to provide.

The entire structure of public funded services to agriculture is one of the greatest marketing hurdles that you will have to overcome. In our situation, faculty attrition at University of California campuses resulted in a small vacuum in services provided to the golf course industry in California. As a result, we were able to establish a business that mimics a university extension program, but that is supported by private funding. One of our greatest business advantages is that we take the best components of university extension programs and discard the administrative and publishing load the universities have placed on extension specialists. Unfortunately, we do not have all of the extension research equipment and labor capabilities that are needed to study what is really happening in some cases. When we encounter more complicated problems, we still depend upon

university researchers, most of them are in states with strong turfgrass programs, to solve more basic biological problems.

**Knowledge:** Acquisition of the knowledge needed for effective plant diagnostics goes beyond a conventional university education. You are all aware of the many techniques that are available for identifying a plant pathogen. But when several pathogens or other environmental factors are involved, our academic experience falls short of the mark in providing an effective diagnosis and recommendation. I gained information on-the-job as a Post Doc in Dr. Raymond Grogan's laboratory at the University of California Davis. This broad exposure working with a variety of graduate students and in the field solving problems was extremely valuable. My experience at Mycogen Corporation managing mycoherbicide development also expanded my experience. Even after six years of university and industrial experience in plant pathology, I was unprepared to step out as a private practitioner. I needed to gain more experience in soil chemistry and nutrient management. Brookside Laboratories, New Knoxville, OH, a contract soil, tissue, and water testing laboratory provided some essential assistance. Combined with reviewing old soils courses and diagnostic aids from every source (APS, Libraries, other diagnosticians, the internet), I am now comfortable and effective in providing a diagnosis. But it is never over. Acquiring knowledge is a never-ending process that is both challenging and rewarding. The more knowledge you command, the more effective you will be in your job – even if you do not select private practice.

**The Four-C's of Consulting.** After reviewing PACE Consulting's awkward entry into the diagnostic service consulting arena, four factors stand out as being critical to establishment of a successful business. They are: Cash – Confidence – Credibility – Communication.

**Cash:** Dr. Jerry Caulder, formerly President and CEO of Mycogen Corporation provided words of wisdom that stuck with me from the beginning “never run out of cash.” If you use this rule to guide all financial decisions, you will not lose track of your business direction.

PACE Consulting was started using cash from sales of stock options that I had accumulated at Mycogen Corporation. Unfortunately, this cash dried up rather quickly and Wendy invested in the company for about five years before a significant profit was recorded on the books. Considering income lost due to lack of gainful employment in addition to plowing all income back into the business and also the financial support from Wendy, the figure for startup exceeds several hundred thousand dollars. A simple guess for the amount of money that you might need to start up a similar business and bring it to profitability would be to guess at the income needed to maintain your current lifestyle, for example, \$50,000 per year and multiply by five years. The estimate would be about \$250,000. Did I have any idea that we would plow this much money into a business before we turned a significant profit? No.

There are many ways to avoid this initial start-up cost. The best method is to have ready-made clients and income. For example, if you are an extension agent that provides diagnostic services already, you will simply have to convert your public supported program into a private one and begin to charge a fee for your services. Your only consideration will be loyalty of your clients when a new public supported professional is hired into your old position and offers services for free. Another way to ease the start-up costs is to depend upon a spouse to replace the lost income as Wendy and I did. The scenarios are unlimited – all you have to remember is to “never run out of cash.”

**Confidence:** If you are already considering private practice, you probably already have the confidence to enter the business. In the agricultural industries, clients (growers or managers) want the bottom-line from a confident source. They don't want to purchase information that MAY be the answer. You should always let the client know the variables that will affect the performance of your recommendations or if you need additional information but the way you communicate must always exude confidence – you need to trust your own judgements.

**Credibility:** The only way to become credible is through experience. Unfortunately, knowledge does not necessarily bring credibility. Credibility is a combination of knowledge and application of the knowledge to solve problems effectively.



Credibility is one of the most difficult hurdles to overcome. Again, if you are moving from an Extension position into the public sector, credibility is almost always a given. If you move from one unrelated sector of the agricultural industry to another, such as the move we made in starting PACE, credibility takes several years to establish.

The first five years of a consulting business are critical. It is in those years that you build the foundation for the future. Never put profits before complete and correct diagnoses and recommendations. Mistakes in the private sector can lead not only to damage and losses for your client but loss of everything that you have struggled to build if litigation finds you at fault for the losses. There is no room for mistakes.

One of the ways that we gained credibility was to team up with a progressive agrochemical distributor in the area who wanted to provide additional services to their clients. They provided the credibility that allowed us to expand our client base rapidly. They also provided a side-benefit in selecting clients that were known to be able to pay their bills. We have had very few problems with collecting receivables – this is extremely important when you start a consulting business. Do not expect payment more rapidly than 30 days after the client receives their invoice – sometimes 90 or 120 days are needed before payment is received. If you are the most credible source of information, your information will have the maximum value to your clients.

**Communication:** Rapid response and effective communication of your diagnoses and recommendations is the product that separates you from the competition. Written reports and verbal communication are the work product. The speed of turn-around is critical. For diagnosis of turfgrass diseases, we turn samples around within 48 – 72 hrs of receipt at the lab by providing a faxed report. We frequently return results within 24 hrs. In the turfgrass industry, there is little room for isolations and more detailed diagnostic procedures. However, there are always problems that can not be easily identified in a short period of time. For those diagnostic problems, the client is informed within 48 – 72 hrs that additional steps are needed and what precautionary practices might be used while further diagnostic procedures are being conducted (e.g. soil test results).

In summary, there is no blueprint for starting and living the profession of agricultural consulting and plant diagnostics. Is it possible to start a plant diagnostic clinic and make a decent living? Yes. Is it an easy carefree lifestyle? No. Not especially in the first few years of business. But if you enjoy hands-on plant pathology, a broader view of plant disease management or plant health management, and you are an entrepreneur at heart, this may be the career for you. If you have specific questions on starting your own diagnostic business, please drop me an email and I will try to by best to provide an answer.

## FEATURE ARTICLE

### Tree Pathology and Related Reference Books

**Linda Haugen, Plant Pathologist  
Forest Health Protection, S&PF, USDA Forest Service  
1992 Folwell Avenue, St. Paul, MN 55108**

A request was made for a list of current, useful texts and reference materials on tree pathology. I make no claim that this list is complete, but it should be a good starting point for rounding out your reference library; if you know of other good texts and references, let me know. I've tried to include primarily more recent texts (less than 20 years old), but have also included some older materials that are still very useful. Many of the older texts are now very difficult to acquire, but may be available through used bookstores. To give an idea of cost and availability, I have provided notes on where to acquire some of the books. There are additional notes at the end. The price in parentheses after some listings is the current cost on Amazon.com.

#### **General Textbooks on Forest Pathology and Entomology**

*Principles of Forest Pathology*, F. H. Tainter and F. A. Baker. Published 1996, John Wiley & Sons, Inc., New York. 805 pp. This is a new forest pathology textbook. One nice feature is disease profiles of important tree pathogens. (~\$125)

*Field and Laboratory Guide to Tree Pathology*, Robert O. Blanchard and Terry A. Tattar. 1997 (2<sup>nd</sup> edition). (~\$84).

*Diseases of Shade Trees*, Terry A. Tattar. 1978. 361 pp. or 1989 (revised edition), (~\$62)

*Tree Disease Concepts*, Paul D. Manion. 1981. Prentice-Hall, Inc. Englewood Cliffs, NJ. 399 pp. (~\$62.50)

*Forest and Shade Tree Pathology*, D. W. French. 1991. 278 pp. This spiral bound book is used in the forest pathology course at the University of Minnesota, and is available from the Department of Plant Pathology for about \$12.

*Forest Entomology (Ecology and Management)*, Robert N. Coulson and John A. Witter. 1984. John Wiley & Sons, New York. 669 pp. (~\$135)

*Principles of Forest Entomology*, Fred B. Knight and Herman J. Heikkinen. 1980. 5<sup>th</sup> Ed. McGraw Hill, NY. 461pp. (Amazon.com listed this book as being currently out of stock at the publisher).

### **Identification of Diseases**

*Diseases of Trees and Shrubs*, Wayne Sinclair, Howard Lyon and Warren Johnson. 1993 (Third Edition). Cornell University Press, 575 pages. Excellent reference with many color prints. Anyone who works on tree and shrub diseases should have a copy-- it is a companion volume to "Insects that Feed on Trees and Shrubs". (~\$62.50).

*Diseases of Forest and Shade Trees of the US*, George H. Hepting. 1971. Agriculture handbook 386. USDA Forest Service, Washington, D.C. 658p. Old reference, but no real replacement is available. Only available used, going price on the internet was \$12 to \$18 when I last checked.

*Fungi on plants and plant products in the US*, by David Farr, Gerald Bills, George Chamuris and Amy Rossman. 1989. 1252 pages. Available from APS Press for \$99.

*Compendium of Conifer Diseases*, ed. Everett Hansen and Katherine Lewis. 1997. 128 pp. Available from APS Press for \$37.

*North American Polypores (Volumes 1 & 2)*, R. L. Gilbertson and L. Ryvarden. 1986, 1987 (respectively). Fungiflora, Oslo, Norway. (Amazon.com listed this publication as being currently out of stock at the publisher).

***Identification of Diseases-- Regional***

*Tree Diseases of Eastern Canada*, ed. D. T. Myren. 1994. This is a spiral-bound book with good information on diseases common to this area. This publication is available from bookstores or by mail from: Canadian Government Publishing – PWGSC; Ottawa, Ontario K1A 0S9; Telephone: (819) 956-4800. Costs \$46Can if it is purchased in Canada. (~\$52)

*Field Guide to Tree Diseases of Ontario*, C. Davis and T. Meyer. 1995. Canadian Forest Service, 135 pp. Good reference, pocket sized. Free copies should be available in limited quantities by contacting: Publication Services, Great Lakes Forestry Centre, PO Box 490, Sault Ste. Marie, Ontario P6A 5M7; Tel.: (705) 949-9461.

*Forest Diseases of the Prairie Provinces*, Y. Hiratsuka. 1987. Canadian Forestry Service, Information Report NOR - X- 286, 142 pp. Good book, but see note below.

*A Field Guide to Forest Insects and Diseases of the Prairie Provinces*, Y. Hiratsuka, D. Langor and P. Crane. 1995. Canadian Forest Service, 297 pages. Excellent color photographs, Pocket sized. Contains all the insects and diseases in the book “Forest Diseases of the Prairie Provinces” and “Tree and Shrub Insects of the Prairie Provinces”, but in smaller format and with somewhat reduced descriptions of management options. Available thru UBC Press for \$29.95 (see address at end of list).

*Pest of Landscape trees and shrubs: An Integrated pest management guide*, Steve H. Dreistandt, Jack K. Clark, Mary L. Flint. 1994. 327 pp. Publication 3359. IPM Education and Publications, Statewide Integrated Pest Management Project. University of CA, Davis, CA.

*Diseases of Pacific Coast Conifers*, Robert F. Scharpf. 1993. Agriculture Handbook 521. USDA Forest Service, Pacific Southwest Research Station, Albany, CA 199p.

*The Tree rusts of Western Canada*, Wolf Ziller. 1974. Publication 1329. Pacific Forest Research Centre, Canadian Forestry Service, Victoria, BC.

*Field Guide to Diseases and Insect Pests of Idaho and Montana Forests*. 1987. S.K. Hagle, S. Tunnock, K.E. Gibson, C.J. Gilligan. USDA For. Serv. Northern Region, 123 pp. This one has excellent pictures of each disease.

*Foliar fungi of western trees*. A. Funk. 1985. Canadian Forestry Service, BC-X-265, 159 pp.

*Parasitic Microfungi of western Trees*. A. Funk. 1981. Canadian Forestry Service BC-X-222, 190 pp. The above two focus on fungi and are well illustrated.

*Diseases of Trees in the Great Plains*. J.W. Riffle and G. W. Peterson. 1986. USDA Forest Service Gen Tech Rep RM-129, 149 p.

*Common Tree Diseases of British Columbia*. E. Allen. D. Morrison, and G. Wallis. 1996. Canadian Forest Service, 178 p. Great pictures!

In addition, there are dozens of brochures and booklets on individual forest insect and disease pests. Major series published by the US Forest Service include the Forest Insect and Disease Leaflets (FIDLs), Pest Alerts and How-To's. Many of these are available on the www at [http://willow.ncfes.umn.edu/ftb\\_pub.htm](http://willow.ncfes.umn.edu/ftb_pub.htm) . Other resources are available from Canadian Forest Service and the various provincial governments, and from the various state agencies within the USA.

## Identification of Insects

*Insects That Feed on Trees and Shrubs*, by Warren Johnson and Howard Lyon. 1988 (Second Edition). Cornell University Press, 556 pages. Excellent reference with many color prints. This book is a valuable resource for ornamental tree and shrub insect pests. (~\$62.50)

*Insects of Eastern Forests*, 1985. USDA Forest Service, Misc. Publication 1426, 608 pp. **(BROWN cover)** Or *Eastern Forest Insects*, 1972. USDA Forest Service, Misc. Publication 1175, 642 pp. **(YELLOW cover)**. Both of the above are good reference books for the biology of forest insects; most information is the same in both books. (You may be able to acquire copies of either version through a used bookstore.)

*Western Forest Insects* R.L. Furniss and V.M. Carolin. 1977. USDA Forest Service Misc Publ No. 1339, 654 pp (available used).

*Caterpillars of Eastern Forests*, by David Wagner, Valerie Giles, Richard Reardon, and Michail McManus. 1997. USDA Forest Service publication FHTET-96-34. 113 pages. Descriptions and color photographs of many caterpillars. Available from Government Printing Office for \$14. GPO is now on the web at:  
[http://www.access.gpo.gov/su\\_docs/sale.html](http://www.access.gpo.gov/su_docs/sale.html)

*Tree and shrub insects of the prairie provinces*, WGH Ives and H.R. Wong. Canadian Forestry Service Information Report NOR - X- 292, 1988. 327 pp. See note on "A Field Guide to Forest Insects and Diseases of the Prairie Provinces".

*Insects of eastern larch, cedar, and juniper*. A.H. Rose and O.H. Lindquist. 1980. Canadian Forestry Service 100 pp. (I believe this one is out of press... try used bookstores)

*Insects of Eastern Pines.* A.H. Rose and O.H. Lindquist. 1973. Canadian Forestry Service, 125 p. Revised in 1998 by K. Nystrom. Available for \$35.95 from UBC Press.

*Insects of eastern hardwood trees.* A.H. Rose and O.H. Lindquist, 1982. 304 pp. Revised in 1997 by K. Nystrom. Available for \$45.95 from UBC Press.

**Related Topics: Christmas Trees, Seed & Cone, Nursery**

*Christmas Tree Pest Manual*, Michigan State University Extension. 1998 (Second edition). Very good reference for identifying Christmas tree pest problems (color photographs). This is also an excellent reference for most general conifer pests in the Lake States. Newly revised. (Cost is \$20 from MSU Extension: Phone 517-355-0240, ask for Bulletin E-2676.)

*Christmas Tree Pest Management*, William Merrill, 1995. 187 pp. "Individual pest notes on one hundred and two common... Christmas tree pests." This soft-bound book is copyrighted. There is no publisher listed in my copy, so I assume it is available from either Dr. Merrill or State College of Pennsylvania.

*Cone and seed diseases of North American Conifers*, J.R. Sutherland., T. Miller, and R.S. Quinard. 1987. North American Forestry Commission Publication Number 1, 77p.

*Forest Nursery Pests*, Charles Cordell, Robert Anderson, William Hoffard, Thomas Landis, Richard S. Smith, Jr., and Harvey, Toko. 1989. USDA Forest Service Agricultural Handbook 680.

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Most of the USDA Agric. Handbooks and General Technical Reports were available at one time for free. I am unaware of any central location from which these publications can now



be acquired. I would suggest consulting with your nearest USDA Forest Service Forest Health Protection office to see if they have copies of them.

Canadian Forestry Service is now the Canadian Forest Service, within Natural Resources Canada. Their website is <http://www.nrcan.gc.ca/cfs/>. This might be a starting point if you are trying to track down some of the Canadian publications. UBC Press publications can be acquired from the University of British Columbia; 6344 Memorial Road; Vancouver, BC; V6T 1Z2; Phone: (604) 822-5959; Fax: 1-800-668-0821; e-mail: [orders@ubcpress.ubc.ca](mailto:orders@ubcpress.ubc.ca)

Special thanks go to Dale Bergdahl, Fred Baker, Susan Frankel and Frank Tainter for their suggestions of additions to this list.

Happy Book Hunting!

## Minutes of the Diagnostics Committee Meeting American Phytopathological Society

*Montreal, Quebec*

August 8, 1999

1. Introduction

The APS Diagnostics Committee Meeting was held on August 8, 1999. The meeting was conducted by Chair Elizabeth Hudgins. There were 26 people in attendance.

Committee Members in Attendance		Members Absent
Elizabeth Hudgins -BC Julie Beale -KY Steve Koike -CA Tom Stebbins -TN Vice Chair Cheryl Smith -NH Bal Rao - OH Karen Snover -NY	Ellen Bentley -WA Past Chair Meg Williamson -SC Gail Ruhl -IN Jackie Mullen -AL Bill Cobb WA/OR/ID	Tim Schubert -FL Susan Lerner -MA Stephan Briere -WY

Others Present		
Marc Sabourin - ON Tom Creswell -NC Ron Ykema -AZ Anna Pfender -AZ Charles Semer -FL	Laura Pottorff-CO Bob Mulrooney -DE Karen Rane -IN David Kolb -NY Peggy Sellers --IN	Melodie Putnam -OR Margery Daughtrey -NY Larry Brown -FL Chet Sutula

2. Minutes of the Committee Meeting in Las Vegas, NV ---1998  
The minutes from the previous meeting were distributed. Cheryl Smith motioned to approve, seconded by Bal Rao and approved by the committee.
3. Election of Vice Chair  
Karen Rane was nominated by Elizabeth Hudgins to be the Chair-Elect, seconded by Steve Koike and approved by Committee voice vote. Karen will chair the 2001 meeting in Salt Lake City.
4. Members leaving the committee this year.

Bill Cobb, Tim Schubert, Gail Ruhl and Cheryl Smith were thanked for their three-year terms of service to the committee.

5. New members nominated  
Karen Rane IN, Tom Creswell NC, Lindsey duToit –WA, David Scott –D-squared Biotechnologies, and Melodie Putnam –OR (Nominated by her Department Chair after this meeting) were nominated to join the committee.  
Upon approval of the APS Council, their three year service will start with the meeting in New Orleans –2000.
6. All individuals present introduced themselves.
7. Activity Reports
  - A. Diagnostic Committee Poster ---  
Meg Williamson –designed and set up the 1999 poster and volunteered for this duty for the 2000 meeting. Cheryl Smith suggested that a permanent rollup heading be made for the poster.
  - B. Working Group  
Gail Ruhl organized this discussion group for anyone interested in diagnostics. About 25 people attended the meeting. Several topics were discussed including clinic issues, support and new methods used. Ed Brown –GA demonstrated the Georgia Distance Diagnosis System and discussed his idea for a broader network of diagnostic experts connected via the Georgia server.  
Gail agreed to organize a similar group for New Orleans –2000
  - C. Diagnostic Quiz ( Plant Disease Contest)  
Julie Beale organized the contest this year. Two carousel projectors were used. The contest was held at a booth on the main floor with the exhibitors Even though comparatively few (about 50) take the quiz, it was a good location for everyone to see the Diagnostic Committee in action. Julie suggested that pictures should be solicited from different parts of the country for variety.  
Tom Creswell will organize the contest in New Orleans.
  - D. Rapid Diagnostic Workshop  
Marc Sabourin coordinated this popular workshop.  
Marc agreed to organize this workshop for the 2000 Meeting in New Orleans.
  - E. APS Members Breakfast –Diagnostics Table – Ed Brown –GA presented information on the Distance Diagnosis System.
  - F. Diagnostic Committee Social  
An informal gathering was arranged by Elizabeth Hudgins at a restaurant in the old part of Montreal. Tom Stebbins will organize a social in New Orleans.

8. Methods and Practice of Plant Disease Diagnosis (Diagnostic Sheet Project) -- Charles Seemer discussed the status of this project. He has contacted the Food and Agricultural Organization (FAO) of the United Nations and he plans to collaborate with them to post some of the information. The committee also discussed the new APS online journal to be named Plant Health Progress. This may be a good forum for the project also.  
The committee took no action.
9. Activities planned for New Orleans --2000
- A. Diagnostics Committee Poster --Meg Williamson
  - B. Diagnostics Working Group -- Gail Ruhl
  - C. Diagnostics Quiz --Tom Creswell
  - D. Rapid Diagnostics Workshop --Marc Sambourin
  - E. APS Members Breakfast --Diagnostics Table
  - F. Diagnostics Social- Tom Stebbins
    - Other activities co-sponsored by the Diagnostics Committee
    - 1. Extension Diagnostics in the New Millenium --(colloquium) Sponsored by the Extension committee (Ed Brown). Our contacts Gail Ruhl, Peggy Sellers
    - 2. Town Meeting: Ask the Plant Doctor -- Sponsored by the Extension Committee (Mike Ellis) Our contact is Meg Williamson and Julie Beale.
    - 3. Certification --How & Why (discussion) Sponsored by the Private Practice Committee (John Hart) Our contact is Laura Pottorff.
    - 4. Approaches for Diagnosing Turfgrass Diseases (discussion) Sponsored by the Turfgrass Pathology Committee (E. Nelson) Our contacts Karen Rane, Karen Snover
10. Update on the Agdia Diagnostics list serve system.  
Chet Sutula said the system is working great. Lots of good communications have taken place.
11. Other Items  
Jackie Mullen brought up an item concerning illustrations.
12. Meeting was adjourned. Next meeting will be in New Orleans August 12-16.  
Tentative future meetings will be Salt Lake City, UT --2001, Milwaukee, WI -- 2002, Charlotte, NC 2003

Respectfully submitted,

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## Diagnosics Committee Bylaws

### A. Purpose of Diagnostic Committee

1. Represent APS members concerned with diagnosis of plant diseases including diagnostic labs and industries, which develop and market diagnostic tools.
2. Serve as a discussion group for issues of concern for those involved with disease diagnosis.
3. Assess the need for and then sponsor any project, which will improve diagnostic plant pathology. These projects may include workshops, symposia, discussion, special displays, presentations or other events at national APS meetings, regional APS meetings and at other appropriate meetings and times.

### B. Structure of Diagnostics Committee. The committee will consist of up to 20 members including a chairperson, chair-elect and an immediate-past-chair. The editor of PDQ may or may not be an official committee member, but he or she is automatically included in committee meetings.

1. **Membership.** Committee members are chosen by the Chair and approved by the present membership. Any APS member interested in serving on the committee should submit his or her name for consideration. Prospective member's names will be submitted to APS council for final approval. Members serve for three-year terms, which are staggered so that each year one-third of the membership will be replaced with new members. The membership should represent a broad range of geographic regions and laboratory types and include private companies as well as state supported facilities involved with plant disease diagnostics.
2. **Chair-Elect.** Any APS member may nominate the Chair-Elect candidates. Elections will be held at national APS meetings, and only committee members may vote. Committee members may vote in advance by mail.
3. **Chairperson.** After one year of service, the Chair-Elect will become Chair. The Chair will conduct committee meetings, serve as spokesperson for the committee, and help coordinate committee and sub-committee activities. The Chair will arrange for meeting agenda and minutes of all diagnostic committee meetings to be published in PDQ. The Chair will serve for one year.
4. **Immediate-Past-Chair.** After one year of service, the chair will become Immediate-Past-Chair. This office provides counsel and assistance to the Chair as needed. The Immediate-Past-Chair will serve for one year.

C. Newsletter of Diagnostic Committee

1. Plant Diagnostics Quarterly Newsletter - PDQ. PDQ is a quarterly newsletter for diagnosticians and any other interested persons: (a) the Editor-in-Chief is a volunteer position of indeterminate length. The editor is responsible for coordinating feature articles and collecting other information pertinent to diagnostic work for publication in PDQ; (b) the managing editor serves as business manager and provides general assistance to the editors; □ Editor and managing editor must be members of APS.

D. Conduct of Diagnostic Committee Meeting.

1. Robert's Rules of Order (Revised). All meetings will be conducted using Robert's Rules of Order.
2. Meeting Agenda. The meeting agenda will be prepared by the Chair and mailed to all members in advance of the meeting and published in PDQ.
3. Minutes of Meetings. Minutes of meetings will be prepared by the Secretary (as designated by the committee chair person) and approved by voice vote of all members present at the following meeting. Any APS member present may make objections and additions to minutes.
4. Activities: Activities to be sponsored by the committee may be proposed by any APS member. Decisions on sponsored activities will be made by vote of APS members attending meetings. Consideration will be given proxy votes by committee member. Activities that do not have clear support will not be undertaken. The committee may set up subcommittees as needed for specific activities.
5. PDQ Report. Report of PDQ financial status, business, future articles, etc. is made by editor and/or assistant editor.