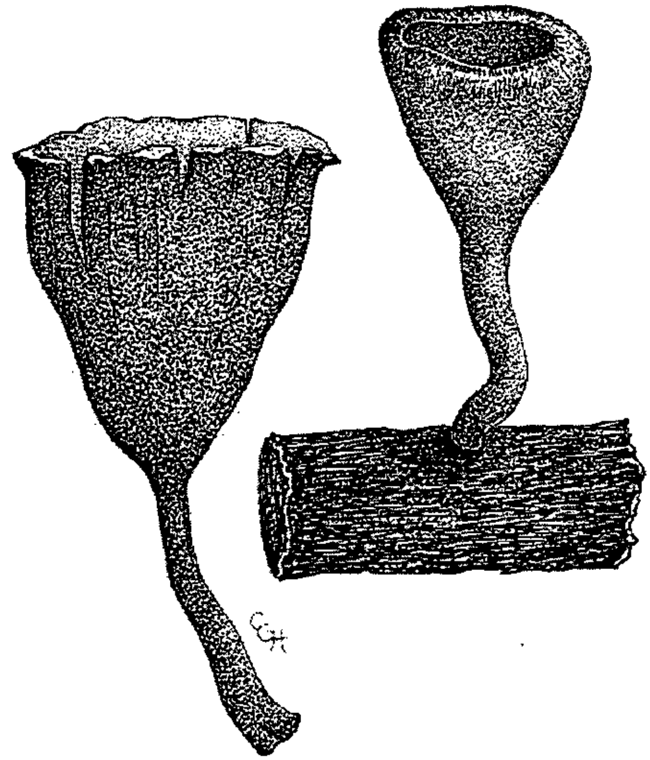
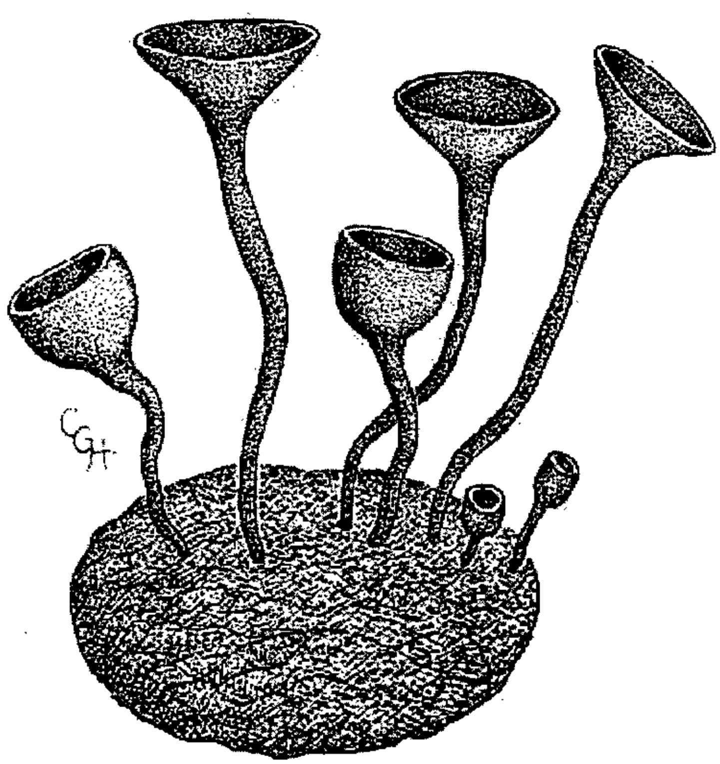
September 1999
Volume 20, Number 3

Plant Diagnostics Quarterly





Feature:

Recent Developments for the Management of Seed-Borne Late Blight

On the Cover:

(clockwise from right) *Urnula craterium* mature and young apothecium on wood, causes canker of oaks; *Monilinia fructicola* apothecia arising from mummified peach fruit, causes brown rot of peaches and other stone fruit.

Cover Art reproduced with permission from "**Illustrated Genera of Ascomycetes: Volume I and II**", APS Press. Courtesy of Richard T. Hanlin, University of Georgia, Plant Pathology Department (drawings by Carol Gubbins Hahn).

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.

Yearly Subscription Fees:

USA and Canada	$15.00
Overseas	$25.00

Back Issues in stock:

USA and Canada	$2.50 each
Overseas	$2.50 each + postage

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Send subscription payments, requests for reprint and address corrections to the Managing Editor: Gail Ruhl, Department of Botany and Plant Pathology, Purdue University, 1155 Lilly Hall of Life Science, West Lafayette, IN 47907-1155. Make checks payable to Purdue University.

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 past summer there was a heated debate about "Digital Diagnostics" being waged on the pages of Phytopathology News. I would like to invite any of you with a viewpoint on this subject to please send me your views on this subject for inclusion into the News & Views section of PDQ. I am not trying to start a new battle here in PDQ but I would like to hear from those of us in the trenches who do most of the day to day diagnostic work.

This month's feature article is authored by Gary Franc who is the Extension Plant Pathologist at the University of Wyoming. Gary has worked with potato pathology for over 15 years and is currently the main focus of his research program. The article which he has authored for this issue deals with the problem of potato seed tubers as a source of primary inoculum for the late blight fungus. Gary also discusses research efforts to manage seedborne inoculum with various fungicide seed treatments.

I am still looking for anyone who would be willing to author a regular column which would deal with molecular methods in plant pathology. Probably starting from the basics and increasing in complexity. This would be a great column to help introduce many diagnosticians to molecular methods and keep all of us up to date on the latest methods. If anyone is interested, please contact me for more information.

Yes, we still need feature articles (>5 pages), short articles, or new columns, or new factsheets (250 copies) for inclusion in PDQ. Please remember that PDQ is a great forum to share information with fellow diagnosticians.

Best Regards,

Stephan

Stephan Briere, Editor
briere@uwyo.edu

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Enclosures:

- Diseases of Echinacea on the Canadian Prairies. 1999. Kan-Fa Chang, Ron Howard, Sheau-Fang Hwang and Stan Blade. Alberta Agriculture, Food and Rural Development. Agdex 630-2.
- University Plant Disease Diagnostic Facilities - Fees and Services, Compiled by Gail Ruhl.
- BIOREBA Ag, Agro-Diagnostics Since 1980.

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**. 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 a 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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Managing Editor - PDQ
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1155 Lilly Hall
Purdue University
West Lafayette, IN 47907-1155

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

ISSUE:	**MARCH**	**JUNE**	**SEPTEMBER**	**DECEMBER**
Copy Due*:	2/19/99	5/21/99	8/20/99	11/19/99
Printing Date:	3/12/99	6/11/99	9/10/99	12/10/99

* - 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@uwyo.edu) any items you would like posted to this section, thanks.]

NINTH ANNUAL VIRUS INCLUSION WORKSHOP

Dates: January 24- 26, 2000

Place: University of Florida
Florida Extension Plant Disease Clinic

Registration Fee: $450.00 - Limit 9

Hosts :
Gary W. Simone, Ph.D., Professor, Richard E. Cullen, Senior Biologist, Plant Pathology Department, Mark D. Gooch, Biological Scientist, University of Florida, I.F.A.S.

Plant virus inclusions are valuable for diagnosing viruses at the group level, and in some instances can be used to identify a specific virus. They can be detected with a light microscope when properly stained. Inclusions induced by a specific virus have the same characteristic appearance across a host range. The procedures are simple, rapid and inexpensive and can save valuable antisera as well as direct in the selection of proper techniques for identifying plant virus diseases.

Course Description:

A 3 day introductory course for scientists, diagnosticians, and/or technicians who have no previous experience or limited experience with virus inclusion identification. "Hands-on" labwork will include virus inclusion identification of potyviruses, tobamoviruses, potexviruses, cucumoviruses, comoviruses, tomato spotted wilt virus, and geminiviruses. Other groups will be demonstrated through the use of prepared slides and kodachrome slide presentations. Staining techniques, tissue selection, and tissue preparation will be covered. All materials will be provided including use of a compound microscope for each participant. A monograph of virus inclusions will be supplied to participants.

Due to limited space and facilities, interested individuals must pre-register for this limited enrollment workshop.

For additional details, course agenda, or registration, please contact:
Dr. Gary W. Simone
Florida Extension Plant Disease Clinic
P.O. Box 110830
Gainesville, FL 32611-0830
Phone 352-392-1795
FAX 352-392-3438
University of Florida E-mail: extppclinic@gnv.ifas.ufl.edu

Registration:

The registration fee for this 3 day workshop is $450.00 per person. Registration includes the costs of preparation of infected plant material for at least 18 viruses representing eight major virus families. In addition, each participant will receive a revised Plant Virus Inclusion Monograph, and a pair of watchmaker's fine forceps for tissue stripping. Shuttle service from airport and hotel to the workshop each day and lunch trips is provided. Refreshments during the day are complimentary. Registration does not include meals, lodging, or travel-related costs.

Attendance is limited to the first 9 individuals that confirm interest to FEPDC staff by phone or FAX. Registration form and fee must be received no later than December 17, 1999 to confirm a place in this workshop. Please complete the lower portion of this registration form and return this with remittance to:

Florida Extension Plant Disease Clinic
University of Florida
Bldg. 78 Mowry Rd.
Gainesville, FL 32611-0830

Make registration check payable to: Plant Disease Clinic
A registration receipt can be procured at the start of the workshop.

9th ANNUAL PLANT VIRUS INCLUSION WORKSHOP REGISTRATION

(Print, complete, and return)

Name: ____

Date: January 24 - 26, 2000

Institution: ____

Address: ____

____

Phone: ____________ FAX:____________ E-mail:________________

Arrival by: Air____ Car____
If air, Airlines________________ Flight#__________
Date/Time of Arrival____
Will you need shuttle from airport? (circle) Yes No
Lodging Selection (circle)
Hampton Inn - Cabot Lodge - Archer House - Super 8 Motel - Motel 6

Will you need daily shuttle service? (circle) Yes No

Help!

I am currently putting together a feature article for a future issue of PDQ that will deal with the dreaded Fairy Ring mushroom problem on turf (I like fairy rings!). I am planning to cover the biology and ecology of the fairy ring mushrooms as well as try and gather as much information, past and present, on controlling this menace to society. I will also try and compare the different control recommendations and group them in geographical occurrence.

Well, I need your help gathering the control recommendations and information on any current research efforts. If you could please send me any factsheets your Extension office has (or e-mail me with a link where I can print them off the web) and e-mail or write me with any reports or information on current research efforts. Thank you.

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REGIONAL REPORTS

NORTHEAST
Cheryl Smith

Drought, drought, heat (HOT) and more DROUGHT! This certainly seems to be the primary topic this growing season, particularly in the mid-Atlantic states. New England has also suffered (the lake I live on is 3 feet below normal!). Water bans and dry wells have been abundant throughout the Northeast. August finally brought some rain to a few areas & some tropical moisture will hopefully come our way during the fall. As usual, it seems like there are still plenty of problems and diseases to keep all of us on our toes.

Woody Ornamentals

Maryland - Ethel Dutky

The drought is killing many landscape trees and shrubs. Spider mites loved the hot weather and causing major damage. Thanks to the dry weather there was no Discula anthracnose submitted on flowering dogwood. Phytophthora has caused major root rot problems on holly (production), and is killing nursery bayberry (Myrica), Pieris, azalea and rhododendrons as well as landscape Microbiota. Drought stress-related diseases (from previous years) include: Botryosphaeria cankers on landscape Pieris, rhododendron and boxwood, and Diplodia tip blight on 2 needle landscape pines. Redfire (*Phyllosticta cryptomeriae*) was identified on *Cryptomeria*. Problems on juniper were: juniper midge *(Contarinia juniperina)*, shoot *blight* and Kabatina tip blight. A Leyland cypress was received with Seiridium or Monochaetia canker (there's "some debate on what fungus this is, what I see is acervuli associated with pitching cankers, the acervuli have what I would identify as Monochaetia"). Other problems/diseases identified included: high temperature injury to rose petals, especially light colored ones (The temps were in the 105F range); Septoria leaf spot on dogwood; Sclerotinia shoot blight on forsythia; black root rot (*Thielaviopsis basicola*) on production and landscape hollies; Cenangium canker on landscape pines; Cylindrocladium blight on grafted dwarf conifer pines; DED on American Elm; and Atropellis canker on landscape/Christmas tree pines (esp. Scots pine).

A couple of interesting insect problems were: oaks with heavy "jumping oak gall", a cynipid wasp (*Neuroterua saltatorius*) leaf/twig gall, the leaf galls detach from the leaf and jump around like tiny "jumping beans"; and very lager populations of spring canker worms that defoliated maples, apples and oaks.

New York - Karen L. Sirois

Many woody plants are showing heat and drought stress symptoms. Wilt diseases have been common: Verticillium wilt on maple, Fusarium wilt on spicebush (*Lindera benzion*) and Dutch elm disease on numerous American elms from the Central Park area of NYC. A monkey puzzle tree was received with *Rhizoctonia solani*. A number of Japanese Pagoda trees, which had been planted as street trees, were diagnosed with a Macrophoma infection causing canker-like symptoms and severe dieback. Arabis mosaic virus was confirmed on *Vinca major*, and Rhizoctonia stem and root rot was identified on *Vinca minor*. Conifer problems included: Cytospora canker on spruce; Rhizosphaera on Colorado blue spruce; Armillaria root rot on balsam fir; Swiss Needlecast on Douglas fir; Fern-Fir Rust on white fir; and Phomopsis needle blight on yew.

Maryland (Dept. Agric) - Anne Bird Sindermann

What's new? Drought, drought and more drought. Here are some of the things I've seen on ornamentals. Some nice quince rust samples on Bradford pear fruits. Ash anthracnose and Discula anthracnose have come into the lab numerous times this year, mostly from home landscapes. In shrubs, Botryosphaeria cankers, surely related to drought stress, are pretty common. In late May, I received a beautiful sample of leaf blight on witch hazel ('Arnold's Promise') caused by *Phyllosticta hamamelidis*. Leaf blight was the most damaging symptom but spots were also present on some leaves. Phytophthora has been cultured from Sargent juniper, forsythia, and the usual rhodies and azaleas. Black root rot is the first thing I look for in *Ilex helleri* and other hollies.

Massachusetts - Susan Lerner

Dutch elm disease was identified on smooth leaf elm (*Ulmus minor*) and American elm. Daphne ("Carol Mackie") nursery stock was infected with Phytophthora and Rhizoctonia. Sphaeropsis was diagnosed on white, red and scotch pines. Other diseases diagnosed included: Volutella on Pachysandra and boxwood; Quince rust on Amelanchier, and bradford pear; Phomopsis on juniper; Ploioderma on Japanese black pine; Ash rust (lots); Hemlock (hydrangea?) rust; anthracnose on maple; Thyronectria on honeylocust; and white pine blister rust (in a landscape with gooseberry).

New Hampshire - Cheryl Smith

Ash leaf rust was everywhere this year! Well, at least within a 25 mile radius of the seacoast. A late frost (3rd week of May) caused injury on crabapple, juniper and balsam fir. Several samples of balsam fir were received with Phomopsis cankers at the soil line (associated with last spring's late frost injury). Cicadas caused damage to lilacs and Henry Lauder walking stick. Botryosphaeria canker and dieback was identified on crabapple, rhododendron, lilac and Kousa dogwood. Although it was dry, bacterial blight was common on lilac (probably so much inoculum around from last year). Monilinia shoot blight was prevalent again this year (as in the past 6 years) on dwarf cherry, sand cherry and flowering almond (Bob Mulroony also saw this in mid-June on flowering almond). Other diseases diagnosed were; Kabatina and Lophodermium needlecast on juniper; Sphaeropsis on mugo pine; powdery mildew on 'gold flame' honeysuckle; Cyclaneusma needlecast on Scots pine; Phomopsis canker on Kousa dogwood; Discula anthracnose on flowering dogwood; anthracnose on sycamore and weeping cherry; and Phomopsis causing shot hole on an ornamental Prunus shrub.

The drought and heat caused early defoliation of many tress as well as outright death of trees planted in the last year. Several hemlock samples were received with most of the new growth wilted and browning. The drought is also causing lots of worry about the fall foliage...will there be any color?, will the colors be as bright?...and of course...will the tourists come (i.e., $)?

Delaware - Bob Mulroony

From nearby Longwood Gardens I saw Phyllosticta leaf spot on Hamamelis x intermedia, symptoms were identical to those in Sinclair, Lyons, and Johnson. Lots of interveinal browning and blackening due to drought conditions as well as marginal leaf scorch. Old leaves on tulip poplars are turning yellow and dropping. Sycamore leaves are turning brown and dropping. Mature trees and shrubs planted on raised beds or burms are really in severe drought stress.

Herbaceous Ornamentals & Greenhouse

Maryland - Ethel Dutky

Southern blight on lots of landscape perennials including ajuga, thyme and sedum. CMV was diagnosed on Aconitum and Stoke's Aster. Rust (*Puccinia asterii*) was also diagnosed on aster. Foliar nematode were identified on both landscape and production perennials, ferns and Anemone x hybrida. A sample of Hakonechloa (an ornamental grass) was received with a Drechslera leaf spot/blight. Heat and excessive fertilizer release was causing problems on mums (this has been noted throughout the Northeast predisposing the plants to diseases such as Pythium & Fusarium). Other perennial diseases diagnosed included: Daylily leaf streak (*Aureobasidium microstictum*); Alternaria leaf spot on production hosta; with downy mildew (*Peronospora lamii*) on Lamium; Cercospora leaf spot on Rohdea and Viola; Rhizoctonia web blight on thyme; Phytophthora wilt/blight on production sedum; bulb mite causing rot and wilt on production hosta; and Pythium and Rhizoctonia root rots on many production perennials. Ethel also noted "It's Back!!" - Balansia head blight *on Pennisetum orientale* 'Hameln'.

Diseases on greenhouse and bedding plants included: Phytophthora on Madagascar periwinkle; alfalfa mosaic virus on Lisianthus (it stunted them); black root rot (*Thielaviopsis basicola*) on Fuchsia; INSV on Coleus; bacterial blight (Xanthomonas, did not see the other one this year) on florist geranium; and Botrytis on lots of crops.

*Anne Sindermann (Maryland-Dept... Agric) mentioned she received nice sample of rust (*Uromyces ari-triphylli*) on Jack-in-the pulpit.

New York - Karen L. Sirois

Impatiens with INSV and bacterial leaf spot; poinsettia with Rhizoctonia solani and Pythium; Artemisia with powdery mildew; and hosta with Colletotrichum leaf spot. She also received samples of Siberian Iris from a breeder who suspected a bacterial disease that was described in the literature in the 1950s. They are still in the process of analyzing a number of the samples. One Pseudomonas bacterium was detected on one sample so far. One other unusual sample was received: Purple Loosestrife with *Rhizoctonia solani*. "Many may wonder why someone would be concerned with a problem on this invasive species. A researcher here at Cornell is conducting experiments in a greenhouse setting hoping to develop environmentally friendly control strategies for this pest. She has become quite frustrated because her greenhouse plants are being killed by the Rhizoctonia infection prior to her applying any of her biocontrol agents." (maybe the Rhizoctonia could be looked at as a bicontrol?)

New Hampshire - Cheryl Smith

Samples diagnosed included: Coleosporium rust on aster; Ascochyta stem canker on Monarda; leaf streak on daylily; INSV on verbena and impatiens; Fusarium stem canker on Phlox subulata; Alternaria leaf spot on hosta; Pythium root rot on impatiens; Fusarium crown rot (and wind damage) on Anagallis; Fusarium wilt & Ascochyta ray blight on potted mums. A couple of interesting symptoms were due to abiotic factors: low pH & Fe/Mn toxicity caused distorted growth & chlorosis on morning glory; and on princess flower - spray injury caused a rust-like discoloration of the leaves, but closer examination showed only the epidermal hairs were affected (desiccated).

Delaware - Bob Mulroony

Question. Has anybody seen ringspot virus symptoms on barrenwort or red epimedium (*Epimedium rubrum*)? I have seen something that looks like it twice. Is it Prunus necrotic ringspot?

Turf

Massachusetts - Gail Schumann

Environmental stress was the dominant feature of the summer beginning with a spell of extremely hot weather in early July, followed by exceptionally little rainfall and continuing hot spells until early August. New plantings of bentgrass and annual bluegrass that had filled in ice-damaged areas from the previous winter were particularly hard hit. Pythium blight was an active disease this year, which despite annual fears, is not that common in New England. The typical summer stress diseases were also common: Ascochyta and Leptosphaerulina blight, anthracnose, summer patch, take-all patch. Melting-out and red thread were common in lawn turf. Nematode counts were record-breaking and actually caused root symptoms in some samples. This was probably due to two relatively mild winters previous to this summer. As of this writing, no gray leaf spot (*Pyricularia grisea*) on perennial ryegrass had been reported.

The controversial disease, bacterial wilt of annual bluegrass, was observed, but its role as a primary cause of turf decline is uncertain. It was observed most often where annual bluegrass plants were relatively immature and had filled in ice-damaged areas. This may because they are the annual types of bluegrass that are most susceptible to bacterial wilt or because they were less able to withstand the environmental extremes to which they were exposed. Some superintendents reported an improvement following the use of the copper products, Kocide or Junction.

New York - Karen L. Sirois

Turf samples over the past few months have been submitted with the following diseases; summer patch, brown patch, anthracnose, Curvularia leaf blight, Leptosphaerulina leaf blight, thatch buildup, and drought stress.

New Jersey - Rich Buckley

Rich said he diagnosed close to 500 turf samples since mid-May (he's 'sick of grass'). The main rush came after the July 4th, 100F heat wave. One of his clients called July 6th "the day of death" because his turf literally cooked as they ran from green to green to hand water and syringe. Besides heat/drought injury, a lot of superintendents were caught off-guard by Pythium blight. Because it was so dry and rather cool through the late-spring, it seemed that preventive Pythium applications were ignored. ("We really haven't had full bore Pythium pressure for the last couple summers anyway. Many golf course superintendents have short memories.") The Rutgers recommendations suggest June 10 for beginning a Pythium-prevention program.

Lots of fairway turf was received with non-descript dead patches. Many turf managers thought they had gray leaf spot, but July was a bit early for the disease. (It doesn't help that "cart path pathologists" called every bit of drought stressed ryegrass gray leaf spot this year). The dead spots were primarily (we feel) due to heat/water/compaction/localized dry spot issues. Much of the turf was covered with Curvularia, Leptosphaerulina, Fusarium, and/or Alternaria. Houston Couch calls Curvularia, Leptosphaerulina, and Colletotrichum senectopathic disorders in his Diseases of Turfgrasses text. ("A nice way to say the turf has to be nearly dead to get infected").

As for gray leaf spot...the disease popped up on the Rutgers turf farm about July 22nd. The disease attacked a new seeding of perennial rye (approx. 8-10 weeks old) that was double irrigated (border between two plot areas), and not inoculated, but downwind 50 yards from a highly inoculated area. Since then the disease has spread to mature areas and is 'lookin pretty good'. There was only one confirmed diagnosis as of August 16th - a ryegrass rough area from a Virginia course.

Rich mentioned that they found the new disease "dead spot", caused by an undetermined species of *Ophiosphaerella* at the Rutgers turf farm. (Peter Dernoden reported on this in the April Plant Disease and had a nice article in the June issue of Golf Course Management with a good photograph of the pseudothecia). The turf symptoms appear a lot like dollar spot/copper spot/or cutworm injury, but slightly larger patches. They have seen the disease on a couple of newly-constructed courses in Pennsylvania (sand greens and L-93/G-2 bentgrasses). The turf farm plots are sand-based green simulations with L-93 bentgrass.

Summer patch and brown patch have been prevalent on home lawns. "These are diseases of affluence, being most common in the high input, Kentucky bluegrass lawns favored by our suburban residential clients". Anthracnose and anthracnose basal crown rot were common submissions.

Rich also noted ..."the new hysteria in golf turf was bacterial wilt. It seemed that suddenly everybody wanted their dead *Poa annua* to have been killed by *Xanthomonas*. Seemed the obvious abiotic issues didn't satisfy some superintendents, but what I really fear is that some diagnosticians are making this diagnosis a little too easily. It does not surprise me that there is evidence of bacteria in a slide made from a heat/drought stressed, over-watered, trampled, 1/8th inch, winter annual weed. I have seen what appears to be streaming from some of these grass blades, but can never prove that the bacteria we are seeing is doing more than just rotting dead grass. All of our attempts to isolate a Xanthomonas have been negative. We handle it like we would handle any other bacterial pathogen, so we don't thick methodology is the problem. We always isolate Erwinias and other junk, but never our target. There seems to be some doubt among the turf pathologists about this (I called a few). Maybe somebody ought to do a little research to straighten things out. At any rate, I would appreciate any help I can get, even if it's just an opinion." So...if anyone has some input for Rich.....

Rich also reported "Last, but not least, huge nematode populations in almost every soil sample we washed this summer, very cool". (We are a strange bunch)

A special note of congratulations to Rich on the birth of his new daughter (July 30)

New Hampshire - Cheryl Smith

As noted in the other reports, stress diseases (Ascochyta and Leptosphaerulina blight, anthracnose, summer patch) were common submissions. Melting out, brown patch and leaf spots were common in home lawns. Several samples of Pythium blight were received from golf courses during June, and one case of Pythium damping-off was diagnosed on a newly-seeded home lawn (lots of water during the hottest weather). One interesting home lawn sample looked like a patch disease, but turned out to be heat injury caused by the exhaust of a paint-sprayer that had been moved from 'spot-to-spot' as the house was painted.

Vegetables

Maryland - Ethel Dutky

The drought helped suppress diseases on irrigated vegetables, but a few diseases were noted: tomato aspermy virus and white mold (*Sclerotinia*) on tomatoes, alfalfa mosaic virus on sweet pepper, Fusarium wilt of Basil, early blight on eggplant and Stewart's wilt on sweet corn.

New York - Karen L. Sirois

Fusarium was reported on several crops: Fusarium dry rot on potato, basal rot on onion, wilt on pepper and a *Fusarium* infection on garlic with plant parasitic nematodes. Tomatoes were diagnosed with *Pythium* and herbicide damage. *Phytophthora* was causing damping-off problems in butternut squash. Two other diseases diagnosed were smut on onion and *Rhizoctonia* on arugula. Karen also reported an interesting physiological disorder on Ginseng that could have been easily confused with powdery mildew if not analyzed microscopically.

Delaware - Bob Mulroony

Bacterial vine decay was very prevalent on many potato varieties. It is often described as aerial blackleg. Hot weather and overhead irrigation provided ideal conditions for the disease to develop. Ozone injury was seen early on Red Norland potatoes and on watermelon (icebox types and other susceptible varieties).

New Hampshire - Cheryl Smith

Septoria leaf spot was very common on tomato, completely blighting the plants in a couple of cases. A severe case of bacterial canker was also diagnosed in one commercial field, nearly causing complete loss of the crop. Problems on cucurbits included: Alternaria leaf spot on squash; Fusarium stem & crown rot on melon and angular leaf spot on pumpkin. Pepper plants in one field were damaged by wind. The base of the young plants were girdled as they were blown around in the planting holes. Other samples included Pythium root rot on ginseng, anthracnose stem canker on pepper and Cercospora leaf spot on beet.

Fruit

New Hampshire - Cheryl smith

Cheryl (NH) reported that fire blight was severe in several apple orchards around the state. Symptoms didn't appear until early August. A raspberry sample was also received with classic fire blight symptoms. Other problems on raspberry included cane blight (*Leptosphaeria*) and anthracnose. Blueberry problems included boron deficiency-causing small, distorted leaves; broom rust; anthracnose causing a twig dieback (anthracnose fruit rot had been severe in this planting several years ago); and an interesting case of burn caused by urea. The urea prills were applied manually by throwing a 'handful' near the base of the plants (in some cases, touching the stems). The application was made after several weeks of dry weather but just prior to a short rainfall. The rain dissolved just enough of the urea to burn nearby young canes. The symptoms included wilting of 1-2 canes on scattered bushes. The interesting symptom was the distinct black streak that ran from the soil line up each of the wilting stems. When the bark was removed the tissue beneath the black streak was orange-brown. Strawberries were diagnosed with white fruit rot (*Rhizoctonia*), Fusarium wilt and a complex of weevil damage/Rhizoctonia root rot. One other amazing sample was a couple of apple trees from a grower in Maine who suspected fire blight in a field on 15,000 newly planted (May) trees. Turns out it was all drought injury - they had only been watered once since planting!

Ethel (MD) reported: heat/drought injury, black root rot complex, and Botrytis and Colletotrichum fruit rots on strawberry ; and spur blight on thornless blackberry.

Field Crops

Bob (DE) saw one corn field severely infected with gray leaf spot (Cercospora zeae-maydis). The field was irrigated and planted with a susceptible hybrid. He noted "most of the corn here is now toast". He also noted take-all of Wheat in scattered areas of the state, and numerous fields with fungi causing sooty mold on mature grain heads that had been stressed by the dry weather. Karen (NY) reported wheat with powdery mildew, and another sample with stinking smut. Maize mosaic dwarf virus was noted on corn. Ethel (MD) reported several diseases on tobacco: tobacco streak virus; tobacco mosaic virus; potato virus Y; Granville wilt (*Pseudomonas solanacearum*); Black shank (*Phytophthora parasitica var. nicotianae*); Blue Mold (*Peronospora tabacina*), brown spot (*Alternaria*); and weather fleck (ozone). She said they probably had barley yellow dwarf on wheat, but the drought did in most of the wheat.

SOUTHEAST
Jackie Mullen

field crops

Arkansas. Stephen Vann reported southern blight (*Sclerotium rolfsii)* on soybean. Also, charcoal root rot on soybean was commonly seen on young seedlings in July during a period of dry weather. With rice, sheath blight (*Rhizoctonia sp.)* and rice blast (*Pyricularia sp.)* were both causing problems with the rice crop this year. Nutrient imbalances, particularly sulfur and potash have been noted on >Bengal=, >Cypress=, and >Drew=.

Kentucky. Julie Beale reports that from late May through late July, we spent most of our time working on tobacco samples (as usual). It was an extremely hard year for tobacco growers, even though blue mold, which has been a major problem for the past several years, was relatively mild due to unfavorable weather conditions for sporulation. Blank shank infections were pervasive in most tobacco-growing areas in the state, and plants initially infected with soreshin (*Rhizoctonia)* and a Fusarium basal stem and root rot were predisposed to black shank even in areas where little black shank had been before. Dry conditions further stressed plants and intermittent heavy rains increased black shank infections. We also saw more cases of tobacco with Fusarium wilt (some in combination with root knot nematode but most without nematodes) and tomato spotted wilt virus than usual.

Tennessee. Tom Stebbins reported the following diseases on field tobacco: Fusarium wilt, blue mold, foliar black shank, angular leaf spot, tomato spotted wilt virus, tobacco vein mottling virus, alfalfa mosaic virus. Bronze wilt (unknown cause) and black root rot were noted on cotton. Other diseases reported were crazy top and bacterial blight on corn and common scab and root knot nematode damage on potato.

Georgia. Taft Eaker and Jan Fowler reported that a forage bermuda hay sample submitted for diagnosis revealed *Helminthosporium* and *Puccinia*. Also, a fescue hay sample submitted to be checked for endophytes was positive for *Acremonium coenophialum.*

Alabama. Jackie Mullen reported that dollar spot (*Sclerotinia homeocarpa*) on bahia grass and other grasses was more common than usual. Phytohpthora crown rot on peanut, Colletotrichum leaf spot on sugar cane, and Phomopsis canker on cotton were all relatively uncommon disease occurrences.

The incidence of tomato spotted wilt virus on peanut (and tomato and pepper!) was increased from last year.

<u>fruits</u>

Arkansas. Black rot on grapes and brown rot on peaches were both common diseases this past summer. Anthracnose was observed on thornless blackberry as a stem dieback for the first time. Fire blight (*Erwinia amylovora)* was diagnosed commonly from apple and pear. Scab on apple and pecan was at a low incidence level.

Kentucky. Some fruit diseases of interest throughout this period were black rot of grape (at a few samples each week), bitter rot of apple (a few cases), cedar-apple rust and fire blight on apple.

Of special note was the apple sample received with thread blight *(Pellicularia koleroga)* rhizomorphs and sclerotia covering the surface of leaf blight and twig blight areas. John Hartman at the recent Crossnore Workshop had reported the occurrence of this disease, but it had not been seen on clinic samples until this summer.

Paul Bachi at the disease clinic located in western KY at the U of KY Extension and Research Center (Princeton) reported seeing southern blight on apple stocks and on strawberry plants, two uncommon hosts for this disease in Kentucky.

Tennessee. Tom reported the occurrence of popcorn disease (*Ciboria carunculoides)* on mulberry.

South Carolina. On fruit, Meg Williamson reported a situation with peaches where young peaches had all the symptoms of peach tree short life (PTSL) and many of the usual conditions except that ring nematode was not above the threshold level for significant damage. In one of the samples, dagger nematode was above threshold. A new association? (Meg reported that peaches actually originated in Georgia.)

Georgia. Taft Eaker and Jan Fowler reported the following commercial and homeowner fruit crops and diseases were submitted to the Plant Disease Clinic: pear and apple with fire blight; crabapple and apple with cedar-apple rust; brown rot (*Monilinia fructicola)* on peach and plum fruits; *Apiosporina morbosa* on plum; *Sphaeropsis* sp. on cherry; persimmon wilt (*Acremonium diospyri)*; cedar quince rust on quince fruit; *Phomopsis* sp. on nectarine; Cytospora canker on pear; and apple seedlings with numerous problems including *Sclerotium rolfsii, Erwinia amylovora,* and *Botryosphaeria* sp. Some blueberry problems were caused by *Macrophoma* sp. and *Botryodiplodia* sp.

Alabama. Apples were seen with a variety of diseases this year including cedar-apple rust, white rot (*Botryosphaeria dothidea)*, bitter rot (*Colletotrichum gloeosporioides),* flyspeck on fruit (*Microthyrella* sp.), sooty blotch (*Gloeodes* sp.), and southern blight (*Sclerotium rolfsii).* Blueberry cane cankers caused by *Phomopsis* were noted as unusual. Other diseases seen were: crown gall, Septoria leaf spot, and Botryosphaeria canker on blackberry; black rot on grapes and muscadines; brown rot, bacterial leaf spot, and Rhizopus fruit rot on peach; plum with bacterial leaf spot and black knot; Fabraea leaf spot and fireblight on pear; Septoria leaf spot on blueberry.

<u>vegetables</u>

Arkansas. Stephen reported numerous samples of southern blight (*Sclerotium rolfsii)* on tomatoes, peppers, and beans. Fusarium wilt, bacterial leaf spot, and root knot nematodes were also common. White mold (*Sclerotinia* sp.) was reported on a greenhouse tomato crop. Septoria leafspot and early blight was at a low incidence during the reporting period as was tomato spotted wilt virus. The hot, dry conditions during July resulted in many tomato crop problems. With summer squash, Phytophthora stem rot was diagnosed in a commercial grower situation where plants were grown under irrigation.

Kentucky. Vegetable diseases seen included: bacterial spot on pepper (Incidence was lower than last year, but there were still a number of samples.), bacterial canker on tomato and southern blight on a variety of hosts including bean, pepper, potato and tomato.

Tennessee. Diseases of note included tomato problems with southern blight, southern bacterial wilt and buckeye rot of tomato.

South Carolina. Meg reported seeing vegetables with gummy stem blight on a greenhouse watermelon transplant early in the season, several cases of Erwinia stalk rot of corn, many tomato samples from commercial and home gardens with tomato spotted wilt virus (TSWV).

One commercial grower waited too long for a diagnosis and lost his whole crop. Ten samples from his field were run through Agdia's tomato screen, and only TSWV was detected. Fruits on some of the plants submitted to Agdia and on a number of other tomato plants received at the clinic showed an unusual symptom of bumpiness and cracks with brown leathery tissue surrounding the cracks. Leaves either had classic symptoms or purple new foliage. Bacterial wilt of tomato was received often in the clinic before the drought began in July. Please note that Kevin Ong, a graduate student here at Clemson, would like to receive samples of crops affected by this bacterium for his isolate collection. (Be sure to follow appropriate state department of agriculture regulations when sending diseased plant samples). On bean, Leptosphaerulina leaf blight was detected.

Georgia. A variety of vegetables and their problems were submitted and diagnosed as follows: pea with *Sclerotinia sclerotiorum*; tomato with TSWV, leaf spot caused by *Alternaria* sp., Fusarium wilt, bacterial wilt (*Ralstonia solanacearum)*, Rhizoctonia and leaf spot on pepper caused by *Xanthomonas campestris* pv. *vesicatoria*; bean and okra with *Rhizoctonia*; *Cephalosporium* and *Puccinia* on corn; aerial blight of chicory caused by *Rhizoctonia*; *Fusarium* and *Cercospora* on mustard. *Pythium* and *Fusarium* were diagnosed on ginseng. Pythium and Rhizoctonia root rot of rosemary was also noted.

Alabama. Very hot and predominantly dry weather through out most of the summer caused a reduction in vegetable disease incidence. Diseases seen included the following: beans with Fusarium root rot; corn with bacterial leaf spot and common rust; pepper with bacterial leaf spot, root knot nematode, bacterial wilt, TSWV, and Phytophthora canker and crown rot; pea with Cercospora lead spot; zucchini squash with mosaic virus; watermelon with bacterial leaf spot and gummy stem blight (*Mycosphaerella);* tomato with bacterial wilt, TSWV, Rhizoctonia sore shin, cucumber mosaic virus, and crown rot caused by *Sclerotium rolfsii*; and rosemary with Pythium and Fusarium root rot.

ornamentals

Arkansas. Several samples of Vinca with Phytophthora stem rot were noted, especially when the plants were under overhead irrigation. Anthracnose (*Colletotrichum*) and bacterial leaf spot were among the common disease problems on English ivy from homeowners with sprinkler systems overhead. A sample of creeping juniper was diagnosed with aerial *Rhizoctonia* from a commercial out-of-state grower. Lower branches were blighted with abundant mycelium intertwined on the leaves and branches. Various root rot organisms (*Rhizoctonia* and *Pythium*) were common on ajuga, snapdragons, and geraniums submitted to the clinic. Volutella stem blight was reported on Pachysandra during this period. Cercospora leaf spot of weeping mulberry and crape myrtle was at a higher incidence that last year. Phyllosticta was a common foliar disease of several Japanese maple samples that were submitted.

Kentucky. Samples of landscape plants were fewer than usual due to drought, but we did see a few cases of Verticillium wilt on maple and catalpa and blackberry. Black root rot was noted on holly, barberry, petunia, and pansy. Southern blight was found on portulaca and valerian.

Tennessee. Diseases of landscape plants included: bacterial leaf scorch on pin oak; fire blight on Bradford pear; bacterial shot hole on cherry laurel; downy mildew on four-o'clocks; Ramularia leaf spot on persimmon; rose rosette virus on rose; Alternaria leaf spot on verbena; crown gall on willow; Phytophthora stem rot on vinca.

South Carolina. We saw lots of annual vinca (*Catharanthus* sp.) with problems. Botrytis stem blight appeared early in the season, followed by Phytophthora branch blight, either with or without root rot. A Foster holly with Colletotrichum dieback was submitted. A Tibuchina plant with odd oedema-like symptoms on the leaves (upper and lower surfaces) was found to have rotted roots that were heavily infected with *Thielaviopsis basicola.*

Georgia. Climate conditions continued to be hot and dry, with temperatures at or near 100F. Only scattered thunderstorms brought a little relief. As a result, many heat and drought related plant specimens have been submitted. Summaries for the period mid-May to mid-August, commercial and homeowner ornamental samples, submitted to the Athens Clinic for diagnosis revealed the following crop diseases: Septoria leaf spot on rhododendron and viburnum; Botrytis blight and Alternaria leaf spot on Sanguinaria; Pythium root rots of hydrangea, azalea, gardenia, *Ilex crenata,* helleborus, *Spidelia gentian*, rhododendron, hosta, daylily, nandina, *Pieris japonica*, camillia, geranium, mandevilla, rudbeckia, vinca, cosmos. *Phytophthora* was recovered on rose, azalea, hydrangea, fern, Loripetalum, canna lily and dianthus. *Exobasidium* was diagnosed on *Camellia japonica*, and *C. sasanqua.*

Thielaviopsis was diagnosed on woody and herbaceous ornamentals including *Ilex crenata,* boxwood and vinca. Ever present powdery mildew appeared on crape myrtle, zinnia, and dogwood.

Various rusts have been submitted including rust on lantana, cedar with cedar-quince rust, *Chrysomyxa ilicina* on holly, and leaf rust on iris (*Puccinia* sp.). Also submitted to the clinic for diagnosis was: *Heterosporium iridis* on iris, *Taphrina deformans* on oak, dieback on oleander caused by *Botryodiplodia,* Cytospora canker on pear and maple, oak with *Xylella fastidiosa*, Nectria canker on tulip poplar, *Zelcova* and *Cotinus* sp. with Actinopelte leaf spot, *Sporodesmium* sp. on juniper, canker and dieback on camillia caused by *Glomerella, Gloeosporium* on holly and euonymus, Gnomonia leaf spot on river birch, and spot anthracnose (*Elsinoe corni*) on dogwood. *Fusarium* caused various problems such as root rot on camellia, stem and crown rot of impatiens, crown rot on chrysanthemum and playcodon, and stem blight on *Ilex vomitoria.* Multiple Leyland cypress samples were diagnosed with Seiridium canker and needle blight caused by *Asperisporium sequoiae.* A juniper sample was diagnosed with Rhizoctonia web blight. Other ornamentals diagnosed with Rhizoctonia root rot were camellia, cosmos, *Ilex crenata, Spidelia gentian,* rhododendron, leucothoe, Miscanthus, impatiens, birch, nandina, azalea, Osteospermum, and Loripetalum. *Rhizoctonia* was often seen in complex with *Pythium* and/or *Phytophthora*. Hosts diagnosed with anthracnose -type problems were mondograss, liriope, euonymus, and ivy. Foliar nematode *(Aphelenchoides fragariae)* was seen on hosta.

Alabama. As with Georgia, summer weather was predominantly hot and very dry. Ornamental diseases seen included the following: anthracnose on eleagnus, English ivy, liriope, daylily; Pythium crown and root rot on chrysanthemum, barberry, and Shore juniper; Phytophthora root rot on gardenia, arbor-vitae, and fatsia; Pythium and Phytophthora root rot on dogwood, azalea, boxwood, Buddleia and gardenia. (*Phytophthora* is typically considered the more important and pathogenic of the two.); *Fusarium* and *Pythium* isolated from rotted roots of chrysanthemum and poinsettia; *Phytophthora*, *Pythium* and *Fusarium* associated with root rot of hydrangea; black root rot on Helleri holly; Cercospora leaf spot on crape myrtle; Phomopsis leaf blight and Volutella blight on boxwood; and root knot nematode on daylily. Some other diseases seen included: Phytophthora aerial blight and root rot on annual periwinkle and petunia; powdery mildew on Japanese magnolia; rust and white rust (*Albugo* sp.) on morning glory; impatiens necrotic spot virus on hosta; crown gall on weeping willow; root knot nematode on pear. English ivy samples were more numerous than usual with anathracnose, stem rot, bacterial leaf spot (*Xanthomonas* sp.), Colletotrichum leaf spot, Fusarium stem rot, Phytophthora root rot, and Pythium root rot.

turf grasses

Arkansas. S. Vann reported an increase in the incidence of the zoysia mite on Meyers Z-52 over last year. Leaf rust was a common disease on bermuda and fescue. Gray leaf spot and brown patch were especially common on St. Augustine grass. The hot/dry conditions during several weeks have resulted in numerous root related problems on golf course greens (bentgrass) and homeowner lawns of hybrid bermuda and zoysia. It appears that weather conditions are the primary factor in decline.

Kentucky. Julie Beale observed southern blight on turfgrass from golf course fairways. Another turf disease seen frequently was Rhizoctonia brown patch. Also, a couple of cases of Nigrospora blight were noted.

Tennessee. Tom Stebbins reported root knot nematodes isolated from bentgrass greens and red thread *(Laetisaria fuciformis)* on fescue.

South Carolina. Meg Williamson noted dollar spot on centipedegrass, which is unusual, and also on a bentgrass green. She commented that a number of bent grass greens have been struggling with the hot, dry weather.

Georgia. Taft Eaker and Jan Fowler reported pathogens causing disease problems on turf were: *Pythium*, *Colletotrichum*, *Rhizoctonia*, and *Gaeumannomyces* on bentgrass; *Helminthosporium*, *Pythium*, and *Rhizoctonia* on bermuda; *Rhizoctonia*, *Fusarium* and *Pythium* on fescue; *Curvularia*, *Rhizoctonia*, *Pythium* and *Colletotrichum* on zoysia. *Pythium* and *Rhizoctonia* occurred on St. Augustine and centipede. Also, *Curvularia* was diagnosed on centipede.

Alabama. Turf grass samples and diseases were numerous this past summer despite the dry and hot conditions. Bentgrass diseases seen were brown patch, rust, ring nematode (*Criconemoides* sp.), sting nematode (*Belonolaimus* sp.) and Pythium blight. There has been an unusually high incidence of ring nematode problems on bentgrass golf course areas this summer. Bermuda diseases included: brown patch, dollar spot, Bipolaris leaf spot, rust, Pythium root rot, root knot nematode. On centipede, we saw brown patch, take-all patch (*Gaeumannomyces*). Fescue diseases were brown patch and dollar spot. On St. Augustine grass, brown patch, gray leaf spot, take-all patch were observed. Zoysia diseases were: brown patch, dollar spot and rust.

CENTRAL

Brian Hudelson

Absolutely insane is the best way to describe this past summer's sample load. In Wisconsin, sample numbers ran 78% ahead of last year. Diagnosticians throughout the central region (Paula Flynn, Iowa; Nancy Pataky, Illinois; Sandee Gould, Minnesota; and Loren Giesler, Nebraska; Brian Hudelson, Wisconsin reporting) have mentioned having very busy summers. Below is a very brief summary of the summer's samples.

WOODY ORNAMENTALS

As Sandee Gould put it, "spots" is the word of the summer. Leaf spots and blights of all kinds on all types of woody ornamentals were prevalent throughout the region. *Actinopelte, Colletotrichum, Cylindrosporium, Leptosphaerulina, Phyllosticta* and *Venturia* were all mentioned as common pathogens. Affected hosts included apple, ash, birch, dogwood, hickory, maple, oak, *Spirea*, sumac, walnut and many others. Needle diseases also continued to be commonplace on conifers, especially Rhizosphaera needle blight of spruce and Dothistroma needle blight of pine. Other leaf diseases of interest included confirmed cases of bacterial scorch of oak and birch, and downy mildew on *Viburnum*.

Vascular wilts were also mentioned by several diagnosticians. Dutch elm disease was particularly prevalent in Iowa, Illinois and Wisconsin (over 200 confirmed cases in Madison, WI alone). Oak wilt also continued to be a problem in these states. Verticillium wilt was confirmed in several woody hosts including ash, catalpa, magnolia, and maple.

Canker diseases were also prevalent this summer. In particular Sphaeropsis/Diplodia tip blight and canker was common on Austrian, Scot's and mugo pines, as well as on eastern white pine. Cytospora canker on spruce was also mentioned by several diagnosticians, as was Botryosphaeria canker on dogwood and other woody hosts. In Wisconsin, "golden canker" of dogwood (caused by *Cryptodiaporthe corni*) was common on pagoda dogwood. Sandee Gould also mentioned an interesting case of aerial *Rhizoctonia* on *Viburnum*.

HERBACEOUS ORNAMENTALS

Herbaceous ornamentals seemed to be affected by the same types of problems as woody ornamentals. All types of leaf spots/blights were reported by Central region diagnosticians. In addition, root rots caused by *Phytophthora, Pythium, Rhizoctonia* and/or *Fusarium* were reported for many different species. Sclerotium crown rot (southern blight) and anthracnose stem rot of *Sedum* were reported as diseases of interest in both Illinois and Wisconsin. In Minnesota, Sandee Gould found rust *Uropyxis* (a rust) on prairie clover produced as an ornamental, and in Wisconsin, Curvularia seedling blight was a serious problem on little bluestem, as was Verticillium wilt on purple coneflower.

FIELD CROPS

Field crops, in particular corn, composed a large portion of the diagnostic effort for several area diagnosticians (Loren Giesler, Brian Hudelson, Nancy Pataky) this quarter. All three mentioned seeing seedling blights and root rots (caused by *Fusarium, Rhizoctonia,* and *Pythium*), anthracnose leaf blight (*Colletotrichum graminicola*), gray leaf spot (*Cercospora zeae-maydis*), and Stewart's wilt (*Erwinia stewartii*). In addition, Loren reported identifying brome mosaic virus and Goss's wilt (*Clavibacter michiganensis* subsp. *nebraskensis*). Nancy reported needle, lance and dagger nematodes (*Longidorus breviannulatus, Hoplolaimus galeatus,* and *Xiphenema* sp. respectively) as well. Brian identified wheat streak mosaic, maize chlorotic dwarf virus T and southern rust (*Puccinia polysora*). Paula Flynn also reported identifying crazy top (*Sclerophthora macrospora*).

FRUIT CROPS

Among fruit crops, black root rot of strawberry (caused in part by a complex of *Rhizoctonia* and *Pythium*) seemed to be the disease of the summer. In Wisconsin in particular, a large number of growers had severe problems with this disease. Other reported fruit diseases included black rot (*Botryosphaeria obtusa*) and Phytophthora collar rot of apple, Phomopsis canker of blueberry, black rot (*Guignardia bidwellii*) and anthracnose (*Elsinoë ampelina*) of grape, fire blight (*Erwinia amylovora*) of pear and Phytophthora root rot and late leaf rust (*Puccinia americanum*) of raspberry.

VEGETABLE CROPS

Vegetable diseases seemed particularly severe this summer. Common fungal problems included Septoria leaf spot and Verticillium wilt of tomato, Phytophthora root rot of peppers and cucurbits, late blight of potato (*Phytophthora infestans*), Aphanomyces root rot and anthracnose (*Colletotrichum pisi*) of peas, Rhizoctonia root rot of snap beans and purple blotch (*Alternaria porri*) of onion. Bacterial diseases included bacterial brown spot (*Pseudomonas syringae* pv. *syringae*) and common blight (*Xanthomonas campestris* pv. *phaseoli*) of snap beans, bacterial spot of pepper (*Xanthomonas vesicatoria*), bacterial wilt (*Erwinia tracheiphila*) of cucurbits and aerial blackleg (*Erwinia carotovora* subsp. *atroseptica*) of potato.

TURF

Finally, both Paula Flynn and Nancy Pataky reported having samples of brown patch, summer patch and Pythium blight in their labs.

SOUTHWEST

Tom Isakeit

Arizona - Mary Olsen (Tucson)

We have had a slow summer with most diseases. Summer rain brought more than usual Xanthomonas leaf spot to pepper in southeastern Arizona. Powdery mildew of pepper showed up the first part of September, but we have a Section 18 for myclobutanil which seems to have helped. There was not much powdery mildew on melons, and what has shown up in the last few weeks of the fall melons seems to be under control. Viruses still seem to be hiding, very few problems.

Arizona - Mike Matheron (Yuma)

Its summertime in the desert, which means an ample supply of hot days and warm nights. Our native pathogen, *Phymatotrichopsis* (I prefer *Phymatotrichum*) *omnivorum*, is active this time of year. Phymatotrichopsis root rot has killed sectors of some cotton fields and destroyed some ornamental Ficus benjamina plants in Yuma. Melon plantings were sustaining plant losses due to Macrophomina crown rot and fruit losses due to *Rhizoctonia* infections.

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

The disease situation is very quiet right now on the central coast of California. I have initiated four fungicide trials for downy mildew control in lettuce so far this season and three out of the four have been failures due to lack of disease. Locations where I usually can count on disease are not cooperating this year. Generally, our summer has been a cool one. Harvest schedules are two to four weeks off. Our grape growers predict that the wine grape harvest will be delayed three to four weeks to get the sugars up to where they need to be to make some reasonable wine. This puts the crop in jeopardy of fall rains, so the vintners are a bit nervous right now. I have a problem for you readers. Situation: On the south central coast (San Luis Obispo and Santa Barbara Cos. we harvest asparagus in August and September. Winters are often mild enough so that the fern grows through the winter. We then mow it in July, reshape the beds and start harvesting. The asparagus grows very well, but so does the oxalis and bindweed. Any suggestions on control (management) strategies will be reading with interest!

California, San Diego County - Pat Nolan

I'm getting the usual summer problems due to high salt levels in the soil, root knot nematode on tomato, powdery mildew on many trees, pink rot of palm caused by *Gliocladium vermoeseni* and tomato spotted wilt virus on pepper and tomato.

Although these are not diseases a lot of time has been put into answering calls, looking at samples and surveying for 4 "new" pests: red imported fire ant, redgum lerp psyllid, and the aquatic plants giant salvinia and frogbit.

Fire ants (*Solenopsis invicta*) appear to be getting into parks and yards in southern California on nursery stock and sod. Surveys for this pest depend on baiting with Spam, so the lab has been fragrant, as the baits are prepared. We are still hoping to eradicate this pest.

The redgum lerp psyllid was first found in Los Angeles County in June of 1998 and has spread from San Diego to San Francisco quickly. It makes a sticky, waxy, conical cover called a lerp that protects the immature stages of the insect. It attacks several species of eucalyptus and defoliates them. The fallen leaves are covered with large amounts of honeydew and sooty mold and make a very large mess. We are hoping for some hungry parasites and predators to get introduced soon.

The two aquatic plants are listed as federal noxious weeds and have been for sale everywhere aquatic plants are sold for a number of years. These aggressive weeds *(Salvinia auriculata complex* and *Limnobium spongia)* are considered a threat to wet lands and irrigation canals. Giant salvinia can form mats up to two feet thick in warm, slow moving water, doubling its biomass every two days. The focus has been on education for places selling it and the public who buys it, then dumps it into a lake or irrigation canal.

New Mexico - Natalie Goldberg

It's been a good summer for diseases! "This is the worst year for chile I've ever seen." These words can be heard all over southern New Mexico, from growers, processors and researchers alike. "What's happened to this year's crop?" The truth is there is no single problem which is responsible for the poor conditions this year. The damage has resulted from a combination of factors, all of which placed stress on the plants.

The first and probably primary factor is weather. Chile plants like warm temperatures - both soil and air. Growers typically plant chile in March when they feel the coolest spring temperatures are past. But predicting the weather is not always easy, and sometimes the weather changes. Cool temperatures after planting delayed seedling emergence and seedlings which did emerge grew slowly, developing weak stems. After emergence, high spring winds over a prolonged period added additional stress for the plants. Many seeds and seedlings were simply blown out of the soil. Seedlings that remained were scarred at the crown. Plants with girdled stems ultimately fell over and died.

In addition to blowing soil and seedlings from the fields, strong winds create another problem associated with soil moisture and salt concentration. In some locations, growers were forced to add small volumes of water to the beds in an effort to hold the soil. But these irrigations allowed for salts to build up near the crowns and roots of young plants. Chile is not very tolerant of excessive salt and many seedlings died due to this added salt stress.

Seedlings that were able to withstand the environmental pressure were attacked by a variety of early season insect pests: flea beetles, thrips and beet leafhoppers. While all of these pests cause damage to young plants, one of the most potentially damaging problems occurs when beet leafhoppers transmit the Beet Curly Top Virus. This virus has been in New Mexico for quite a while. It occurs every year to one degree or another. The extent of the damage is related to the overwintering population of the leafhoppers and the winter weed population. The winter weeds serve as overwintering sites for the leafhoppers as well as alternate hosts for the virus. Typically, growers try to manage curly top by planting a thick stand of chile, and then thinning out diseased plants in June. If the stand is thick, damage is minimal, but when the stand is already poor, such as it was this year, additional losses to BCTV compound the overall problem.

By the time Beet Curly Top was identified at significant levels, the chile crop was already in serious trouble. Since mid-June, additional diseases have been taking their toll on the remaining plants. Rain and high humidity create the perfect environment for several diseases that have a potential to cause economic losses. Four different diseases have been identified in the last three weeks: Phytophthora root rot, Verticillium wilt, powdery mildew and bacterial leaf spot.

Phytophthora root rot, also known as chile wilt, is well known in New Mexico. Rows and rows of straw-colored, dead plants left standing in the field are a common sight in many fields. This disease is caused by a soilborne fungus which is well established in New Mexico soils. This disease is triggered by excessive soil moisture. When heavy rains hit already wet fields, the result can be devastating.

Verticillium wilt is another wilt disease caused by a soilborne fungus. It is often overlooked or misdiagnosed because of the occurrence of *Phytophthora*, but it is a very serious disease which is extremely difficult to control once the fungus is established in the soil.

Powdery mildew and bacterial leaf spot are foliar diseases triggered by high humidity. If these diseases start early in the summer, fruit quality and yield are affected. The leaves turn yellow and prematurely fall from the plant resulting in reduced fruit production and sunburning of the developing fruit.

Additional chile diseases identified this summer include: Alfalfa Mosaic Virus, Cucumber Mosaic Virus, Tomato Spotted Wilt, bacterial soft rot on fruit, and Alternaria pod rot.

Other diseases and disorders identified in the NMSU Plant Clinic include: BCTV on tomato, pumpkin, squash, beans, and spinach; early blight (*Alternaria solani*) and gray leaf spot (*Stemphylium*) on tomato; head smut of brome; Rhizoctonia crown and root rot, leaf spot (*Phoma medicaginis*) and Phymatotrichum root rot on alfalfa; Phymatotrichum root rot on apple and pistachio; fungal leaf spots (*Alternaria*, *Phoma*, and others) on rose, chitalpa, ash, mulberry and other shade trees; black spot on rose; Verticillium wilt on cotton; pink root, bacterial soft rot (*Erwinia carotovora*) and sooty mold on onion; fire blight on apple and pear; powdery mildew on Mexican elder, lilac, rose, locust, Mexican bird-of-paradise, pumpkin and other cucurbits; Fusarium wilt on cabbage; *Fusarium*, *Bipolaris*, *Curvularia*, *Rhizoctonia solani*, Pythium, on turfgrass; Dodder in flower beds; bacterial spot (*Xanthomonas campestris* pv. *pruni*) on peach; Alternaria leaf blight, Pythium root rot, and bacterial leaf spot (*Xanthomonas campestris* pv. *cucurbitae*) on pumpkins; Fusarium root rot on pine seedlings; Botryosphaeria canker on Russian olive; rust on currant, poplar, and cotton; anthracnose (*Colletotrichum graminicola*) and Bipolaris leaf blight on sorghum; glyphosate injury on onions and chile; freeze injury on pecan; iron chlorosis on apple, willow, peach, poplar, ash, and many other ornamentals; zinc deficiency on pecan; Weed-n-feed injury on ash; genetic abnormality in pecan; and finally the usual summer stress (heat, drought, wind, and salt) on all types of crops and landscape plants.

Lastly, New Mexico's Karnal bunt testing for 1999 is complete - No Karnal bunt was detected.

Texas - Tom Isakeit

I did a watermelon tour of Texas this summer. In the High Plains (south of Lubbock), I saw a virus-like problem of watermelon that occurred in many fields. The incidence was 10% or higher in fields. The internodes were shortened and growth was stunted, particularly at the terminals of the vines. ELISA tests for the usual suspects of cucurbit viruses were negative. The possibility of widespread drift or carry-over of peanut herbicides (e.g. Pursuit) has not been ruled out. This one stumped us. Some of the fields also exhibited "typical" potyvirus symptoms on a small percentage of plants. Additionally, in one field, I saw a few plants with yellow foliage that resembled a luteovirus or closterovirus symptom. I saw scattered plants like this in the same area last year.

Excessive rains caused problems with watermelons in other parts of the state. In the Winter Garden area (south of San Antonio), I saw a few fields of different cultivars of watermelons that were destroyed by about ten inches of rain that fell all at once, shortly before harvest. Bacterial fruit blotch was also prevalent (20% incidence) in these fields. Another grower in the area reported a problem with bacterial fruit blotch.

In East Texas, gummy stem blight was severe in many watermelon fields. In one field, gummy stem blight and anthracnose occurred simultaneously. In the north-central part of the state, excessive rains contributed to extensive fruit rot of cantaloupes. Yellow vine, apparently caused by a phloem-inhabiting bacterium, was quite severe on watermelons and cantaloupes.

Starting in early July, downy mildew showed up in most watermelon-growing areas of the state. Some fields were devastated by this disease, either because no fungicides were applied, or were applied with poor coverage of foliage.

PACIFIC NORTHWEST, INLAND NORTHWEST, AND UPPER GREAT PLAINS

Ellen Bently

This report covers March through September.

Due to the excessive rain this spring, **Utah** (*Scott Ockey, USU Logan*) has had a large number of anthracnose samples on maple and sycamore trees. This spring has brought reports of numerous samples of *Taphrina* spp. affecting oaks, maples, and peaches. Lots of turf NRS is showing up.

Severe *Botrytis* was reported on a field of transplanted onions, the result of heavy spring rains and deep planting. One grower has had problems with root knot nematode on his greenhouse grown organic tomatoes. Another greenhouse of young tomatoes succumbed to bacterial speck. In addition another grower suffered severe damping off of peppers due to *Rhizoctonia*.

Colorado saw a very mild, dry winter, followed by an unusually wet and cold spring. As a result trees, roses, and other perennials began to leaf out early and were caught by some hefty freezes (*Laura Pottorff, CSU-Denver*

Metro/Jefferson County). Roses have been particularly hard hit.

Virus problems always dominate the ornamental samples. INSV was found in Greek oregano, Coleus, Lobelia, Lysimachia, tomato, Statice, carnation and New Guinea impatiens. TSWV was found in Aster, Lysimachia, and tomato. CMV was found in tomato and Carnation mottle virus was found in carnation.

Several golf courses encountered pink snow mold during a particularly wet and cool period in early May.

Aside from the "normal" root rots etc., some interesting samples came into us from a tropical exhibit at the Denver Zoo. A screw palm was wilting and we found Botryosphearia canker and Phytophthora root rot. Another unusual one for us was a philodendron with Phytophthora leaf blight, and a pothos with bacterial blight.

Stephan Briere, (U **Wyoming,** Extension Plant Pathology Lab) reports a typical summer with a little more rainfall than average in some areas. Some diseases seen on trees have been frost damage of spruce (remember this is Wyoming!), Bacterial blight of Lilac, Venturia shoot blight, Marssonina leaf spot and Cytospora in Aspen, Ash Anthracnose, Cytospora in narrowleaf cottonwood, fire blight and apple scab in apple, powdery mildew in choke cherry, winter injury, hail, iron chlorosis, zinc deficiency and over/under watering in many tree species.

We have diagnosed the following problems in some home garden plants, 2,4-D herbicide damage in tomatoes and potatoes, Early blight in tomato, hollyhock leaf rust and nutrient deficiencies.

Turf diseases included Anthracnose *(Colletotrichum graminicola)*, Grey snow mold (*Typhula sp.*), Snow mold (*Microdochium nivale*), Bipolaris leaf spot, Melting out, and Ascochyta and Leptosphaerulina leaf blights.

Field crop samples included winter injury on wheat; Halo blight (*P. syringae* pv. *phaseolicola*) on Navy bean; Cercospora leaf spot of sugar beet; Leaf rust on bean; white mold, *Rhizoctonia solani* and brown root rot (*Phoma sclerotioides*) in Alfalfa and early blight, late blight, black dot, and blackleg in potato.

One of the oddest samples we received was a green mold sample from a stuffed horse (identified as *Aspergillus sp.*) from the Buffalo Bill Historical Center in Cody, WY.

After spending her first winter in **Western Washington** (*Lindsey du Toit, WSU-Puyallup*) now understands what is meant by a cool, wet winter climate. She reports experiencing a record year for rainfall, 90 consecutive days of precipitation, and this winter/spring. This partially explains why sample numbers have tripled from this time last year. Vegetable growers suffered from abiotic problems related to the extended cool (often just above freezing at night) and wet conditions. Trees and shrubs transplanted within the past year or two into clay/glacial-till soils in areas of urban expansion and development (after construction crews remove all the topsoil) – are falling victim to Phytophthora root rot! Some additional samples, excluding many insect-related problems received, include:

Trees and shrubs: hairy root (*Agrobacterium rhizogenes*) on rose; bud blight (*Briosia azaleae*) and powdery mildew (*Microsphaera*) on rhododendron; *Cylindrocarpon* (not sure if it was pathogenic) on leaves of a bonsai cork oak; bacterial leaf spot (*P. syringae* pv. *viburni*) and Cercospora leaf spot on viburnum; Phyllosticta leaf spot on *Ceanothus* and photinia; Verticillium wilt (*V. dahliae*) and bacterial dieback (*P. syringae* pv. *syringae*) on maples; frost damage on willow; Pythium damping off on rooted cuttings of lilac; crown gall (*A. tumefaciens*) on quince; Lophodermium needle cast (*L. seditiosum*) on Ponderosa pine; Fomes heart rot (*Heterobasidium annosum*) of Noble and Fraser fir; stringy butt rot (*Perenniporia subacida*) of noble fir; Phytophthora root rot on true firs, arborvitae, boxwood, rhododendron, and madrone; Phyllosticta leaf spot on monkey puzzle tree (*Araucaria araucana*); Kabatina dieback (*K. thujae*) on juniper; and Swiss needle cast (*Phaeocryptopus gaeumannii*) on Douglas fir.

Groundcovers: Leaf spotting problems on kinnikinnik and salal including *Exobasidium vaccinii*, *Cryptostictis* (=*Seimatosporium*), *Coleophoma*, and *Phyllosticta* and gray mold (*Botrytis*) on candytuft (*Iberis*).

Greenhouse ornamentals/houseplants: bacterial blight (*X. hortorum* pv. *pelargonii*), oedema, and micronutrient deficiency on geranium; black root rot (*Thielaviopsis basicola*) on fuchsia; gray mold (*Botrytis*) on Bacopa and *Cissus discolor* and foliar nematode (*Aphelenchoides* sp.) on bergenia.

Turfgrass: the usual influx of necrotic ring spot (*Leptosphaeria korrae*), yellow patch (*Rhizoctonia cerealis*), Typhula snow mold (*Typhula* spp.) from eastern WA, and Fusarium patch (*Microdochium nivale*).

Small fruits: purple blotch (*Septocyta ruborum*) on blackberry, gray mold (*Botrytis*) and possibly shock virus (BSIV) on blueberry (still being tested), and red stele (*Phytophthora fragariae* var. *fragariae*) on strawberry.

Tree fruits: European canker (*Nectria galligena*) on apple, and Diaporthe canker (*Diaporthe* sp.) on apple rootstock.

Herbs & vegetables: common scab (*Streptomyces scabies*) of potato, various seed-rotting fungi on edamame bean seed (WSU researchers are looking into this as an alternative crop for the area), cold/chemical injury to spinach seedlings, cold damage to cucumbers in an unheated greenhouse, and extensive crow damage to a cabbage field!

Spring rains and cool temperatures in western WA gave in to encroaching summer conditions in July. It has been a cooler summer than normal for western WA, with an occasional rare thunderstorm in this mild, ocean-tempered region. Nonetheless, we have been seeing an increasing number of plants dying or showing signs of stress in association with the dry and hot conditions of the 1998 summer. Full-grown western hemlocks, in particular, seem to be dying out in well-drained sites with crowded stands of trees. No pathogens yet found associated with these. A lot of Douglas fir trees developed top dieback and/or individual flagging branches, if not complete death.

Several insect pests have been found associated with these symptoms (e.g., Douglas fir twig weevil), and several canker pathogens. Again, this is most likely associated with the low-level drought stress conditions of last summer. Aphid problems were very severe going into summer, particularly on maples and tree fruits.

Some of the summer plant diseases/problems include:

Trees & shrubs: Botrytis blight on peony, cedar, salal and magnolia; bacterial blight/canker (*P. syringae* pv. *syringae*) on ornamental cherry, photinia, and magnolia; European canker (*N. galligena*) and Nectria twig blight (*N. cinnabarina*) on ornamental pear; Entomosporium leaf spot on photinia; Yellow Green Mottle Syndrome (no pathogen yet found associated with this disorder), and rust (*Melampsora occidentalis*) on Douglas fir; fir rust (*Uredinopsis pteridis*); Current season needle necrosis, Phytophthora root rot, and Fomes heart rot on Noble fir; Armillaria root rot on silver fir; Phytophthora root rot on salal; anthracnose (*Discula destructiva*) and Septoria leaf spot on dogwood; black canker (*Colletotrichum gloeosporiodes*) on corkscrew willow; Lophodermium and Lophodermella needle casts on pine; Phyllosticta leaf spot on Nandina; Verticillium wilt of maples; Dutch elm disease, Pyracantha scab (*Spilocaea pyracanthae*); and several samples of herbicide injury from Christmas tree plantations; severe root girdling killing various conifers (giant sequoia, a 10 year old sculpted pine tree sold for $500 that died within two weeks of transplanting, Shasta fir.

Groundcovers: Anthracnose (*Colletotrichum*) on English ivy and the usual leaf spots (*Phyllosticta* and *Cryptostictis*) on kinnikinnik.

Greenhouse ornamentals, flowers & bulbs: Gray mold (*Botrytis*) on fuchsia and larkspur; aster yellows on China aster; rust (*Puccinia iridis*) on *Iris versicolor* (not supposed to be present in WA – interestingly, it only showed up on this species out of the many irises stocked at the nursery); bacterial soft rot (*Erwinia carotovora* subsp. *carotovora*) on *Iris foetidissima*; and downy mildew (*Peronospora phlogina*) on phlox.

Turfgrass: Lots of Typhula blight and Curvularia blight from dry, hot eastern WA; yellow patch (*Rhizoctonia cerealis*) in early July; necrotic ringspot; red thread (*Laetisaria fuciformis*); Fusarium patch and Pythium root rot.

Tree fruits: Phomopsis canker and anthracnose on various apple and pear tree samples; bacterial blight (*P. syringae* pv. *syringae*) of pear; Prune Dwarf Virus on cherry; walnut blight (*Xanthomonas arboricola* pv. *juglandis*) on filberts and English walnut; white rot (*Botryosphaeria dothidea*) on pear; and leaf spot (*Blumeriella jaapii*) on cherry.

Small fruits: Spur blight (*Didymella applanata*) and Phytophthora root rot on raspberry; black root rot complex on strawberry; Botrytis dieback on red currant and fruit rot on raspberry; leaf and cane spot (*Septoria rubi*) on marionberry; and cane blight (*Leptosphaeria coniothyrium*) and anthracnose (*Elsinoe veneta*) on blackberry.

Herbs & vegetables: Powdery mildew (*Erysiphe*), downy mildew (*Bremia lactucae*), tarnish spot (*Pseudomonas cichorii*), and drop (*Sclerotinia minor*) on lettuce; gray mold (*Botrytis*) and possible red leaf (*Erwinia rhapontici*) on rhubarb; angular leaf spot (*P. syringae* pv. *lachrymans*) on pumpkin; an unusual case of *Cercospora* on cucumber seedlings (reported as more of a subtropical disease), but only on the cotyledons and not on the true leaves; damping-off (*Pythium* and *Fusarium*) of cucumber; possible pith necrosis (*P. corrugata*) of tomato; leaf blight (*Botrytis squamosa*) on onion and garlic; and Cucumber Mosaic Virus on pepper.

A cool dry spring reduced sample numbers in **Eastern Washington** (*WSU-Prosser, Ellen Bentley*) but late frosts (29F on June 5!) damaged ornamentals, tree fruits, emerging potatoes, beans and small grains, killed vegetable transplants and ended asparagus harvest. Ten days later, 100F finished off many of the stressed victims. The summer was bone dry but no irrigation water shortages.

Young 'Chelan' cherries collapsed from bacterial canker, drought stress and poor establishment. Other cherries displayed Prunus Necrotic Ringspot, Prune Dwarf and/or Necrotic Rusty Mottle Viruses. Bacterial canker is rampant following the mild winter. Cherry leaf curl (*Taphrina*) was observed. Apples escaped new fire blight infections but chronic problems continue to be lethal. A new apple planting was lost when the nursery shipment was rejected with severe Phomopsis canker on the rootstock. Many cherries displayed Verticillium wilt symptoms by August. Mid-season hail destroyed apples, pears, and stone fruits. Sustained 30 – 80 mph winds bruised and dropped apples before they could be harvested.

Dryland wheat suffered from Tapesia eyespot=*Pseudocercosporella,* crown and root rots and drought. Wheat Streak Mosaic Virus occurred in irrigated winter wheat. Grass for seed and timothy hay developed take-all. Stem nematode stunted many emerging alfalfa stands. Hops, still suffering from a worldwide supply glut and powdery mildew, developed downy mildew as well. Sugar beets had Rhizoctonia crown rot and Cercospora leaf spot.

Sweet corn growers are learning to live with common smut. Late fields were battling Fusarium kernel rots. Heavy thrips and spider mite infestations as well as virus impacted beans. Radish, beets, carrots and green peas had a variety of root rots. Tomatoes were hit by Curly Top Virus. Corky ring spot (Tobacco Rattle Virus) increased in Columbia Basin potato circles. Although there was little late blight, powdery mildew was a problem in many fields. Powdery and common scabs were also present. Late aphid flights and changes in available insecticides resulted in severe potato leaf roll virus infections and tuber net necrosis.

Many landscape conifers are declining from Phytophthora root rots and wood rots following past injurious winter cold and ice storms. Wisteria was diagnosed with a POTY virus (probably WMV2). Extensive Verticillium wilt developed in shade tree species, including an unusual occurrence in English walnut.

Cool, sometimes cold, weather in **Northeastern Oregon** (*Phil Hamm & Joy Jaeger, OSU-Hermiston*) slowed down plant development and impacted disease problems. Just a few decent diseases have been diagnosed.

Many of the samples coming in were the result of herbicide injury or winter injury.

Ergot (*Claviceps purpurea*) contaminated hard red spring wheat seed. Barley Yellow Dwarf and Wheat Streak Mosaic Viruses have been found in winter wheat. Both are widely scattered and causing little overall problem, in contrast to the past two years. Several fields of Kentucky bluegrass have moderate to extensive powdery mildew (*Erysiphe graminis*). A year ago the problem was stem rust (*Puccinia graminis*). However, only occasional light infections have been found to date. *Drechslera* caused leaf problems have also been found on bluegrass. Choke (*Neotyphodium typhinum*) occurred on Chewings fescue.

As for potatoes, the good news was no widespread epidemic of potato late blight. Only one sample was brought in. Potatoes, however, did have other problems. *Rhizoctonia* caused stem damage on emerging plants in some fields. Silver scurf (*Helminthosporium solani*) has been seen on stored tubers. A higher incidence of White mold (*Sclerotinia*) this year as well as black dot (*Colletotrichum coccodes*) may have been due to more prolonged and stronger winds than normal for the region. Other samples sent in had blackleg (*Erwinia carotovora*), aster yellows, Fusarium dry rot of seed pieces, I wonder why (IWW), Alfalfa mosaic virus, powdery mildew, and *Botrytis*. Potato leafroll virus was also widespread and will be responsible for considerable quality reductions in some fields. Early blight (*Alternaria solani*) was at high incidence in some varieties late in the season.

Fruit tree problems brought in included Coryneum (*Wilsonomyces*) blight of cherry and peach, powdery mildew on crabapple and apple, and pear blister mite on pear.

Field crop samples included a test planting of garbanzo beans in a dry land situation which was extensively damaged due to *Sclerotinia* on the seed causing pre and post emergence losses. Cercospora leaf spot on sugar beet, thrips on mint, and alfalfa stem nematode and slime mold on alfalfa.

The big vegetable crop problem was again common smut on corn. There was also *Phoma* on peas, *Botrytis* on onion, white rot on garlic (again due to sets having been brought in from out-of-state) and *Sclerotinia sclerotiorum* on lettuce from Alaska. Fruit samples were found to have Beet Curly Top virus in pumpkin and *Pythium* in both watermelon and cantaloupe. Also cantaloupe with Fusarium wilt and watermelon with powdery mildew was diagnosed. One watermelon field ended up with extensive damage.

Grass was brought in with *Rhizoctonia*, anthracnose and slime mold.

Insects mainly caused ornamental tree problems. They included willow leaf gall sawfly on willow, scale on hawthorn, pine shoot moth on pine, and poplar bark aphid and poplar bark moth on poplar. Diseases were *Verticillium* on catalpa and *Cytospora* on poplar. The most common problems homeowners were having were due to inadequate watering on the sandy soils.

Spring was late in coming to **Western Oregon** (*Melodie Putnam, OSU-Corvallis*). April was cool and dry, while the first part of May was cool and damp - perfect conditions for the flourishing of Monilinia brown rot and bacterial blight. Most of the current problems are related to the sudden drop in temperatures last December, when the mercury hit single digits after hovering around the 30's - 40's. Ornamentals in landscapes and nurseries were most affected.

There was very little of interest that came in this season, in all, it was a pretty dull time. More interesting samples have been *Pseudoseptoria* on *Poa trivialis*, TSWV in greenhouse potatoes and the fungus *Diploceras hypericinum* found in association with stem dieback of St. John's-wort (Klamath weed), a new record for the US, near as I can tell (if anyone has found this previously, I would be interested to know). Anthracnose (*Colletotrichum*) was also found on St. John's-wort, a first for Oregon.

The most interesting samples came from out of state, including foliar nematode (*Aphelenchoides*) in Coleus from Maryland (never seen in ornamentals here); *Verticillium dahliae* in horseradish from California; and yellow leaf blotch (*Sporonema phacidioides*) on alfalfa from Montana (this fungus has never been seen in Oregon).

DIFFUSION

Melodie Putnam
Oregon State University

Resistance of pear cultivars in Oregon to natural fire blight infection. R. A. Spotts and E. A. Mielke (Oregon State University, Hood River) evaluated 4 replicate trees each of 119 pear cultivar/rootstock combinations for disease during a fire blight epidemic. Thirty-four cultivar/rootstock combinations were free of fire blight; while some were past full bloom when disease risk was high and may have escaped infection, most were in full bloom. Trees on OH x F 18 appeared most resistant while the same cultivars on OH x F 40 appeared most susceptible. "The study is most valuable in sorting out highly susceptible cultivars since those without blight may be resistant but also may have escaped infection." *Fruit Varieties Journal*, 1999, **53**:110-115.

***Marielliottia*, a new genus of cereal and grass parasites segregated from *Drechslera*.** R.A. Shoemaker (ECORC, Agriculture and Agri-Food Canada, Ottawa) has described a new genus that differs from *Drechslera* in having mostly 3-septate obovoid to ovoid conidia that germinate primarily from the basal cell, occasionally from the apical cell, and not from the central cells. Three species formerly treated in *Drechslera* were moved into the new genus: *M. biseptata*, *M. dematioidea*, and *M. triseptata*. The three species are re-described and a key is provided that distinguishes between them. Also given is a short, easy to use key that distinguishes between the genera *Exserohilum*, *Curvularia*, *Bipolaris*, *Drechslera*, and *Marielliottia*. *Canadian Journal of Botany* 1998, **76**:1558-1569.

***Phytophthora quercina* sp. nov., causing root rot of European oaks.** Roots of declining *Quercus robur*, *Q. petraea*, *Q. cerris*, *Q. pubescens*, and *Q. ilex* were examined for the presence of *Phytophthora* species. In addition to *P. citricola*, *P. cactorum*. *P. cambivora*, *P. gonapodyides*, and *P. undulata*, an unidentified *Phytophthora* species was isolated from fine roots using direct plating onto PARPNH (V8 agar with 10 μg/ml pimaricin, 200 μg/ml ampicillin, 10 μg/ml rifampicin, 25 μg/ml PCNB, 50 μg/ml nystatin, and 50 μg/ml hymexazol). The fungus was also obtained from rhizosphere soil using oak leaf baits. Isolation attempts using apple or pear baits were unsuccessful. The new *Phytophthora* species was placed in Waterhouse's Group I since it was homothallic with paragynous antheridia and distinctly papillate sporangia. Analysis of RAPD banding patterns supported the relationship to the other species within Group I. The species *P. quercina* is described at length. Pathogenicity tests on oak seedlings resulted in severe dieback of unsuberized and suberized roots, causing necrotic spotting and interveinal chlorosis of leaves. The work was done by T. Jung *et al.*, Institute of Forest Botany, University of Munich. *Mycological Research* 1999, **103**:785-798. (For a related article see "Molecular evidence supports *Phytophthora quercina* as a distinct species," *Mycol. Res.* **103**:799-804.)

***Tilletia walkeri*, a new species on *Lolium multiflorum* and *L. perenne*.** This is the rest of the Karnal bunt story. As a result of the national survey program to determine the extent of KB in the US, spores similar in appearance to *T. indica* (the cause of KB) were found in wheat seed washes from the SE US and from pasture mixes from Oregon. The spores tested positive for *T. indica* using a PCR test, although bunted wheat seeds were not found in the SE US or Oregon despite extensive searches. In 1997 bunted seeds of annual ryegrass (*L. multiflorum*) were recovered from commercial seedlots from Oregon and in annual ryegrass growing as weeds in wheat fields in the SE US. Molecular characterization of the ryegrass disease using RAPD, RFLP-ITS and ITS sequence analyses showed that it is distinct from *T. indica*. This disease has been present on ryegrass for at least 30 years, and is widespread in the seed producing areas of Oregon and New South Wales, Australia. L.A. Castlebury (USDA-ARS Systematic Botany and Mycology Lab., Beltsville, MD) and L.M. Carris (Department of Plant Pathology, Washington State University, Pullman) describe the causal fungus as the new species *Tilletia walkeri*. A key to the smuts known to naturally occur on *Lolium* spp. is given. *Mycologia* 1999, **91**:121-131.

MATERIALS & METHODS

Lindsey du Toit, Washington State University - Puyallup Plant & Insect Diagnostic Lab
Stephan C. Briere, University of Wyoming Extension Plant Pathology Lab

Lab Techniques

Summary of the PDQ survey on "Use of the Soil Extract Water Technique for detecting *Phytophthora* infections in plant material".

(compiled by Lindsey du Toit, Washington State University - Puyallup Plant & Insect Diagnostic Lab.)

I received eleven responses to the PDQ survey on use of the "soil extract water technique" for detecting *Phytophthora* infections in plant material [see Vol. 20(2):27-28 for details of the technique]. Despite the limited number of responses, the variation in comments and array of modifications recommended for the soil extract water technique make for an interesting, and hopefully useful, report. Three respondents either didn't realize there were two sides to the questionnaire or felt the remaining questions were unnecessary. Possible reasons for so few responses:

1) Bad timing to send out a survey in the middle of the busy season
2) The technique is so well known (or infamous?) diagnosticians don't think the survey is necessary.
3) Diagnosticians hate surveys?!

Surveys were received from Auburn University, Clemson University, Maryland Department of Agriculture, Missouri Department of Agriculture, Oregon State University, Virginia Tech., Washington State University, University of Arizona, University of California (Salinas), University of Florida, and University of Massachusetts. Thanks to all who took the time to complete and return the survey! I hope these results and comments are of some value to diagnosticians as we attempt to develop more efficient and cost-effective methods of providing accurate diagnoses to our clientele. If you have further comments or suggestions in response to this report/survey, Stephan Briere (Editor of PDQ) and I would be happy to hear from you – it might even be worth printing in the next PDQ as a follow-up.

Summary of responses to individual questions:

1. *Do you use the SOIL EXTRACT WATER TECHNIQUE to detect* Phytophthora *species in plant samples?*
   Yes - 6 of 11 responses (including those who use a similar technique)
   No - 5 of 11 responses (one of whom said they use the same method to induce sporulation of mycelial disks of *Phytophthora*).

2. *If you answered "Yes" to question 1, how often do you use this technique as a diagnostic tool for* Phytophthora*?*
   a) Rarely - 3 responses (one comment was that this technique does not work as well as isolation)
   b) Whenever I suspect an infection by *Phytophthora* – 0 responses
   c) When clients are not willing/able to pay the cost of more expensive tests (e.g., ELISA) – 1 response
   d) Other: "When identity of the fungus is not evident on selective medium (pimaricin, vancomycin, & hymexazol). We can usually ID *P. cinnamomi* & *P. parasitica* from mycelial characteristics."

3. *If you answered "No" to Question 1, why don't you use this diagnostic technique?*
   Four respondents use *Phytophthora*-selective media routinely (e.g., using PARH medium with results in 48 hours, or P_5ARPH medium). One respondent relies on plant tissues for testing, and one respondent looks for *Phytophthora* in soil and roots using a pear-baiting technique "with excellent results".

4. *What modifications or clarifications do you recommend for the soil water extract technique as described in PDQ 20(2):27-28?*
   a) Several respondents indicated they float "suspect" tissue for a day or two in plain tap water and get sporangia. One respondent uses distilled water, tap water, or sterile pond water. When they have had a negative response with pond water but suspected *Phytophthora*, they used an ELISA kit and so far have always gotten a negative with the ELISA too.
   a) Another respondent warned that some *Phytophthora* species are extremely sensitive to copper, so it is best to use de-ionized water to make up the extract. Water collected from local streams works well. They use water from a stream on the edge of campus, filter the water through a 1-2 micron filter, and get excellent sporangial production from V8 plugs (for differentiating *Phytophthora* from *Pythium*).
   c) Soil from under certain trees works well, e.g., from Port Orford cedars.
   d) Three respondents use the soil extract technique with agar blocks of suspect cultures – two of whom recommend growing the isolate on a V8-based medium and floating sections of the fungus/medium on the water.

5. *Are there specific plant species or plant tissues for which the soil extract water technique is more useful for detecting* Phytophthora *than others? If so, indicate what plants and/or plant tissues.*

One respondent has success with crown material of herbaceous perennials and larger roots of both herbaceous and woody samples. Another respondent is fairly successful with azalea roots. A third indicated they have better luck with all techniques on herbaceous plants than with woody plants. A fourth stated that "*Phytophthora* on soybeans likes our tap water so no need for extract for this pathogen".

6. *What problems have you experienced with the soil extract water technique?*
   a) Detecting *Phytophthora* on root/crown tissue of established conifers (even when ELISA results are positive).
   b) Problems with other fungi growing too fast and obscuring *Phytophthora*, especially when left for several days.
   c) Mixed cultures of *Pythium* and *Phytophthora* can make ID of the fungus confusing.
   d) If results are negative, what have you really shown?

7. *Do you recommend other methods for detecting* Phytophthora *that are relatively quick and inexpensive (i.e., pertinent to a plant diagnostic lab receiving thousands of samples annually)? If so, please describe the method and, where possible, give references.*
   a) Immunological test kits: e.g., Neogen's ELISA test kits (4-piece Alert kit or 96-well kit).
   b) *Phytophthora*-selective media (see below for recipes of selective media mentioned most commonly in the responses):
      - Plate onto PARP or PARPH (see recipes below). Isolates grow out in 3-5 days.
      - Isolation onto PARD, a modification of the Jeffers and Martin PARP medium with dichloran instead of PCNB (see recipe below).
      - One respondent seldom uses selective media because of problems with shelf-life.
   c) Baiting: e.g., apple baiting, or leaf baiting with camellia, citrus, or eucalyptus. The bait used will determine what is picked up. There is no universal bait, but some obvious choices – e.g. Port Orford cedar foliage (young tips) to recover *P. lateralis*; apples, pears, rhododendron leaves, eucalyptus leaves, juniper foliage, etc.

Phytophthora-selective media referenced in the survey:

1) P_{10}ARP(H) or P_5ARP(H): see Kannwischer & Mitchell (1978), Papavizas *et al* (1981), and Jeffers & Martin (1986). These media contain the antibiotics **pimaricin** (active against most fungi except the Pythiaceae in the Oomycetes and some *Mortierella* spp.), **ampicillin** (active against Gram positive bacteria), and **rifampicin** (predominantly active against mycobacteria and Gram negative bacteria). It also contains the fungicide **pentachloronitrobenzene** (PCNB, active against many soilborne fungi except Oomycetes). Addition of **hymexazol** (H) suppresses most *Pythium* spp., but is inhibitory to some species of *Phytophthora*. Refer to Tables 2.2 and 2.3 in Erwin & Ribeiro (1996) for detailed information on relative sensitivities of species of *Phytophthora* and *Pythium* to hymexazol. Jeffers & Martin (1986) modified P_{10}ARP(H) to P_5ARP(H) by reducing the amount of pimaricin from 10 mg to 5 mg per liter of medium for isolation of *P. cactorum*. The medium uses **corn meal agar**, but Dr. Steve Jeffers at Clemson modified the medium for use with **clarified V8 juice**.

For a final volume of 1 L: Autoclave 17 g Difco cornmeal agar in deionized water (adjust volume based on amount of solvents and other dissolved ingredients to be added later). Dissolve 10 mg pimaricin (5 mg for P_5ARP), 250 mg ampicillin, and 25-50 mg hymexazol (the latter if you wish to select against *Pythium* contaminants) in 10 ml distilled water. Dissolve 10 mg rifampicin in 1 ml DMSO, and 25-100 mg pentachloronitrobenzene in 95% ethanol (5 mg/ml). Add the dissolved antiobiotics and fungicide to the autoclaved cornmeal agar after it has cooled to ~45°C. Cover poured plates with a black cloth, and store and incubate plates in the dark because pimaricin is inactivated by light. These media are best used within 2 weeks as antibiotics weaken with age – they can be stored and used longer with less selectivity.

2) PARD: a modification of the Jeffers and Martin PARP medium with **dichloran** instead of PCNB. Dichloran (trade names DCNA, Botran, Dinitranil, and Allisan) is active against fungi like *Botrytis*, *Sclerotinia*, *Sclerotium*, *Rhizopus*, and *Monilinia*.

For 1 L use 17 g corn meal agar and 5 ml of dichloran stock solution (has 2 mg/ml in 95% EtOH) to 994 ml de-ionized or distilled water. Add stirbar. Autoclave for 20 minutes and cool to 45°C. Add the following, using low light as pimaricin and rifampicin are light sensitive. Rifampicin is also heat labile, so make sure the medium is cool before adding:

20 mg Delvocid (pimaricin) in 2 ml sterile deionized water
10 mg rifampicin in 2 ml DMSO
200 mg ampicillin (sodium salt) in 2 ml sterile deionized water

Stir for at least 5 minutes. Cover plates with a black cloth after pouring to protect from light. Store plates in the dark. The antibiotics become weaker with age, so best to use within 2 weeks - but can be used longer with less selectivity.

A very incomplete list of references on diagnosis of *Phytophthora*:

1. Erwin, D.C., and Ribiero, O.K. 1996. Isolation and detection of *Phytophthora*, Chapter 2, pp. 8-41, In: Phytophthora Diseases Worldwide. APS Press, St. Paul, MN. 562 pp. [An extremely valuable and exhaustive, albeit expensive, review of the Genus *Phytophthora*.]
2. Jeffers, S.N., and Martin, S.B. 1986. Comparison of two media selective for *Phytopthora* and *Pythium* species. Plant Disease 70:1038-1043.
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7. Schmitthenner, A.F., and Bhat, R.G. 1994. Useful methods for studying *Phytophthora* in the laboratory. OARDC Special Circular 143. Department of Plant Pathology, The Ohio State University. 10 pp.
8. Phytophthora Newsletters published in the 1970s-1980s have a number of techniques described for working with *Phytophthora*.

Thank you again to those who returned the survey!

Diagnostic Keys

The Fifth Kingdom on-line, the web's most diverse and profusely illustrated mycological site. This is not really a site with diagnostic keys but it contains a huge volume of images of all groups of fungi. The color images help support the print edition of the Fifth Kingdom.

Web Sites

Website addressing diagnosis of *Phytophthora*: Very detailed description by Karin Themann & Sabine Werres of a rhododendron leaf test to detect *Phytophthora* in root, soil, and water samples.
http://www.bba.de/phytoph/diagn_r.htm

The Graphics Gallery is a series of labeled diagrams with explanations representing the important processes of biotechnology. Each diagram is followed by a summary of information, providing a context for the process illustrated. An example depicting Southern Blotting is shown below.
http://www.accessexcellence.org/AB/GG/

New Products

Agdia's Testing Services Announces its New Pathogen Leaflets section: A series of short writings about various pathogens by experts on the subject. There are currently three leaflets available on their site. (http://www.agdia.com/testing/pathogen.leaflets/)

Adgen Agrifood Diagnostics just announced the introduction of an exciting collection of top quality reagents to detect important fungal pathogens. These include fungal plant pathogens such as Sclerotinia sclerotiorum, Monilinia fructicola, Colletotrichum acutatum, Colletotricum spp., Botrytis cinerea, Cladosporium spp., Monilinia fructiginia and laxa and Pseudocersporella herptrichoides . (http://www.adgen.co.uk/)

Bioreba Agricultural Diagnostics has just released a new product called Bio-Check which are 2-hour assays for Potato Virus Y, Tospovirus and Pelargonium Flower Break Virus. (http://www.bioreba.com/index.html)

[Please Note: Plant Diagnostics Quarterly does not endorse or recommend the use of any product or service mentioned above. We are simply making our readership aware of products and services that are currently available.]

FEATURE ARTICLE

Recent Developments for the Management of Seed-Borne Late Blight

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Introduction

Asexual forms of the late blight fungus (*Phytophthora infestans*) overwinter only within infected, living plant tissue. For example, surveys conducted in Ireland over a 50 year period revealed that most late blight outbreaks resulted from inoculum that spread from infected seed, volunteer potatoes and cull piles. Although oospores may play an increasing role in fungus survival, for the most part, late blight epidemics in North American production regions are believed to result from primary inoculum sources similar to those identified in Ireland, with the occasional tomato field targeted as the culprit. Ultimately, whether late blight spreads from cull piles, seed tubers or volunteer potatoes, it is the infected tuber that permits the fungus to survive between growing seasons.

Survival of the late blight fungus in tubers was proposed by Berkely in 1846, so this is not a new concept. De Bary established in 1876 that sprouts produced by infected tubers may be invaded by *P. infestans* and that these sprouts occasionally survive long enough to reach the soil surface and produce sporangia. Thus, these "infector" sprouts serve as infection centers from which late blight spreads. During attempts to repeat De Bary's work, scientists rarely observed infector sprouts because they found that infected seed tubers usually decayed before plants could emerge. Van Der Zaag determined that only about 1 percent of the infected seed tubers actually give rise to infected plants. However, he also determined that only one infected plant per square kilometer (247 acres) was needed to initiate late blight epidemics in the Netherlands.

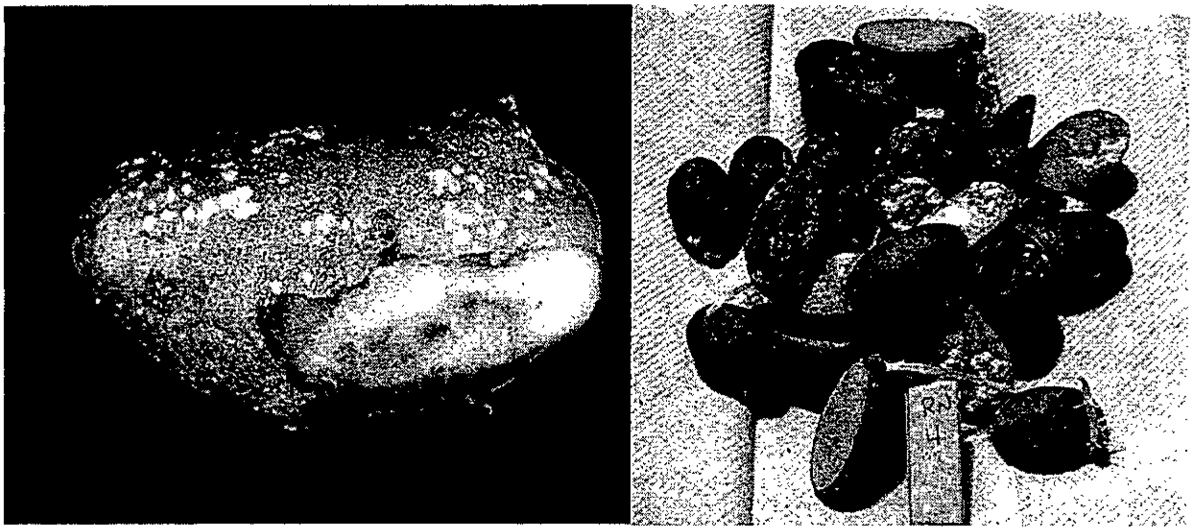

Figure 1. Seed tubers are easily infected by the late blight fungus. Healthy Russet Norkotah seedpieces were tumbled in the presence of an infected source-tuber (*P. infestans*, US1). The source-tuber (left) was immediately removed after tumbling. Growth of the late blight fungus is visible on seedpieces photographed 10 days after tumbling (right).

Current Research

Recently, potato scientists started to rethink how late blight spreads among seed tubers. Since the fungus often produces spores on the surface of infected tubers, could these spores spread and infect healthy tubers in the seedlot during normal handling and cutting practices? Research in Maine, North Dakota, Oregon, Washington, Wyoming and at other locations revealed that U.S. isolates of late blight are readily spread from infected tubers to healthy seed tubers during handling and cutting. Therefore, perhaps a major source of inoculum is not simply the seed tuber with late blight decay, since 99% of these tubers decay before emergence, but also includes the otherwise healthy seed tubers that become infected shortly before planting.

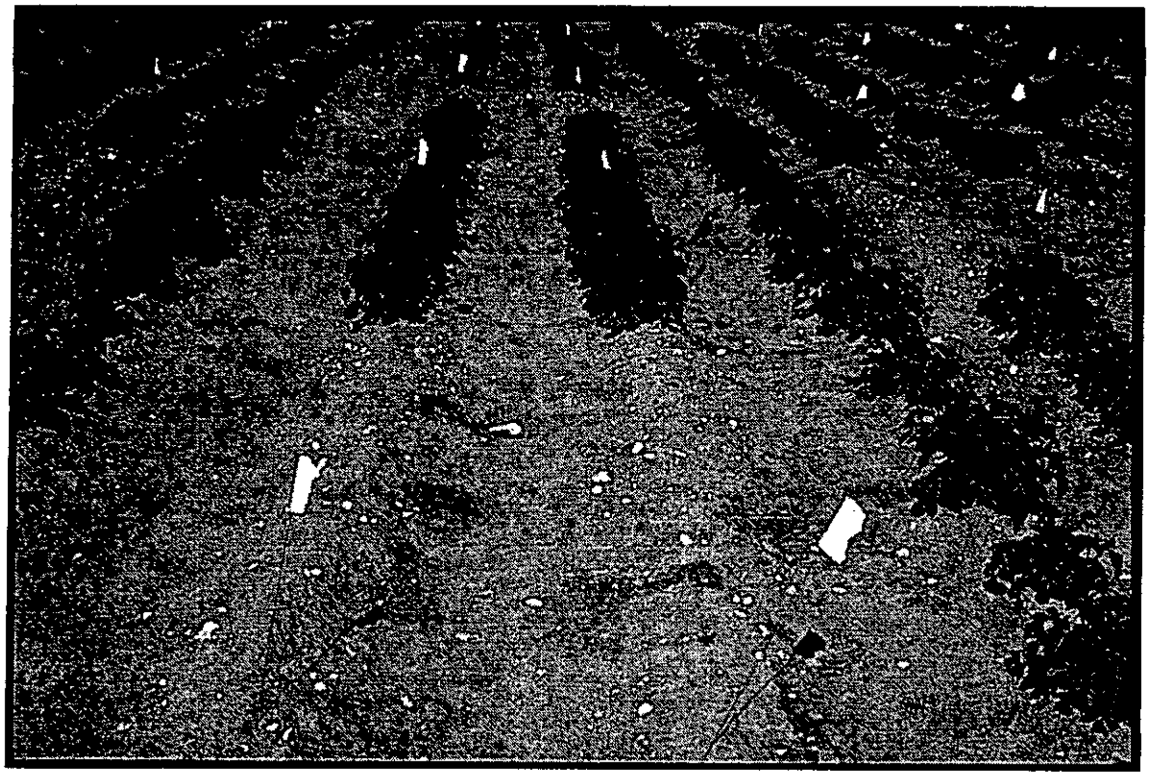

Figure 2. Healthy seedpieces, exposed to late blight-infected source-tubers during cutting and handling, are readily infected and fail to emerge (foreground plot). However, if identical seed is treated with fungicide immediately after exposure to late blight inoculum, seedpieces emerge (background plots) and plants perform similar to those in noninoculated check plots.

Studies were done at the University of Wyoming to determine the effects of planting-time late blight infection on seed performance and to also determine if these effects could be reversed by application of seed treatment fungicides. High elevation and low elevation field sites were established during the two year study to represent a range of environmental conditions present in the irrigated High Plains production area. Some observations from this research are:

1. Seed inoculated with the late blight fungus shortly before planting performs poorly. Inoculated seed emerged more slowly and final plant stands were reduced by 42% (year 1) and by 99% (year 2) compared to the non-inoculated healthy seed.

2. Beneficial fungicide effects were most obvious when fungicides were applied to seedpieces immediately after they were inoculated with the late blight fungus (year 2) versus when fungicide applications were delayed until several days after seed tubers were inoculated and late blight was allowed to become established (year 1). Treatments that included thiophanate-methyl, mancozeb and cymoxanil were most effective at restoring the ability of inoculated seed to establish plants.

During year 1, TOPS 5D and TOPS-MZ 2.5D improved final stands by an average of 7% while addition of cymoxanil to the fungicide increased final stands by an average of 21%. When seed was inoculated with the late blight fungus immediately before fungicide applications were made (year 2), TOPS MZ and fungicide treatments containing cymoxanil all resulted in emergence rates and final stands equivalent to those of non-inoculated healthy seed.

3. Once plants were established in the field, no late blight stem or foliar lesions resulted from the seedborne inoculum. However, these research plots received weekly applications of protectant fungicide which may have reduced our ability to detect infection. Also, conditions were not always favorable for foliar late blight development. Yield effects were a function of treatment effects on stand; if stand was increased then yields were also increased. No phytotoxicity from any treatment was detected in the plots.

In conclusion, several seedpiece fungicide treatments available to potato growers are proven to reduce the late blight spread that occurs during seed handling and cutting. The specific formulations available are based on the labeling efforts for each State; label directions must be followed. It is important to realize that you cannot cure an infected seedlot by applying seedpiece fungicide treatments. Also, seedpiece treatments will not directly protect the foliage of emerged plants from above-ground inoculum sources.

Although most growers will agree that increased emergence is a desirable benefit of seedpiece treatment, don't forget that the plants that emerge from late blight-infected seedpieces may ultimately serve as a source of inoculum from which late blight spreads.

Therefore, is it really desirable to increase emergence by applying fungicide to seed, or should every late blight-carrying seedpiece rot in the ground before it produces a plant? Although the answer is not immediately obvious, if you always start with a seedlot that has no known prior exposure to late blight, application of a fungicide will provide an added layer of protection that prevents the inadvertent spread of late blight inoculum in your seed. In other words, since it is not possible to certify that a seedlot is late blight-free, labeled seedpiece fungicide treatments will ultimately reduce the risk of planting infected seed. Seed treatment fungicides will become an important component of an integrated late blight management program.

[Portions of this article were reprinted with permission from Spud Man Magazine]

Sources of Information

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OFF THE SHELF

Gary Simone
University of Florida

Barnett, H.L. and Barry B. Hunter
Illustrated Genera of Imperfect Fungi. 4th edition
1998. APS Press. 218pp. $43.00
ISBN 0-89054-1922

Some changes have occurred to the old third edition of Barnett's Illustrated Genera of Imperfect Fungi. General introductory material has been added to the new edition that explains the text's basis in the Saccardoan System of fungal identification and its contrast to the present day scheme of Hughes-Tubaki-Barron. The four form orders of the imperfects are described and illustrated with electron micrographs and a brief overview of cytology and morphology for these fungi are also presented. A 31 page key to the imperfects is presented, based upon Saccardoan systematics and is followed by an alternative key based upon conidiogenesis (Hughes-Tubaki-Barron). The latter key is again illustrated with excellent electron micrographs and treats the imperfect genera in a condensed 14-page key.

Hunter has also included a terse treatment of select factors affecting the growth and sporulation of the imperfect fungi. Another short section deals with fungal physiology, culture media, maintenance of stock cultures, and fungal nutrition. For those of us involved in teaching, there are also 15 lab exercises utilizing fungi to illustrate various biological principles like phototropism or nutrient deficiencies.

In general, the new fourth edition is some 20 pages smaller with ~50 genera deleted--the majority of which have no plant pathological significance that I could discern. One notable deletion was the loss of the previously included *Streptomyces* within the key, but after all this is a fungal key! Some nomenclatural changes have been made and the literature citations have been boosted by ~100 new entries. Perhaps the second most notable improvement in the new edition was the darkening of the original ink drawings of fungi, making them easier more accessible for instructional purposes. The most notable improvement in the 4th edition is the edition itself! No matter how much you cherish books, even the casual user will note the inevitable deterioration of the spiral binding and the gradual loss of pages. Now we can stop hunting through used bookstores for replacement copies!

Hanlin, Richard T.
Illustrated Genera of Ascomycetes. Vol. II.
1998. APS Press. 258pp. $35.00
ISBN 0-89054-198-1

Volume II follows exactly in the superb tradition of Volume I. This supplement covers an additional 100 genera of ascomycetes--approximately 25% of which have relevance to Plant Pathology. Some important genera included in Volume II include *Ciborinia, Taphrina, Nematospora, Cenangium,* and *Monosporascus*. This volume is spiral bound like Volume I in the same 9x6 inch format. Each fungal genus is formatted across two or more pages, well spaced, and in a comfortable point size for reading. Each genus is profiled to include such information as mycological description, anamorph, habitat, representative species, comments, and references. Each genus is illustrated by one or more excellent black & white line drawings. This text includes a 13-page key to the genera in Volume II and at least 300 citations to individual genera.

If you deal with fungi in any diagnostic setting, this is a must for the shelf !

Hanlin, Richard T.
Combined Keys to Illustrated Genera of Ascomycetes Volumes I & II.
1998. APS Press. 113pp. $20.00
ISBN 0-89054-199-X

This is the perfect dessert to follow the two-volume treatise on Ascomycetes started back in 1990 with the publication of Volume I. This text deals with over 200 genera of fungi in an artificial key (not phylogenetic) that integrates the individual keys published in Volume I & II. The key is reversible and is based upon ascospore morphology. Genera with more than one ascospore type are entered in each relevant section of the key. The key is divided into four sections based upon ascospore cell number: the Amerosporae (one-celled), the Didymosporae (two-celled), the Phragmosporae (with two or more transverse septa), and the Dictyosporae (with transverse and cross septa). This key is followed by a set of synoptic keys based upon single characters like cell number, ascospore shape, color, ornamentation, surface, germination, fragmentation, asci wall characters, asci shape, ascomal type, stroma formation, ascomal color, and lastly habitat.

This effort also gave the author the chance to update taxonomy and make corrections for Volume I. Following the keys is a section of genera with revisions, corrections, and new references. Hanlin has also included an excellent 10 page glossary to enable more of us to actually use the keys and the requisite illustrations of ascospore terminology, shapes, and tissue types for those of us whose mycology exposure dates back to more primitive times. The author has gone to considerable work to enable more plant pathologists to identify ascomycetes by key rather than by thumbing through the pictures. Key use reinforces the terminology and sharpens our ability to describe what we observe microscopically. Key use can be a satisfying activity if we can force ourselves to expend the time--especially since the author has made it so convenient for us.

Kahn, Robert P. and S.B. Mathur (eds.)
Containment Facilities and Safeguards for Exotic Plant Pathogens and Pests.

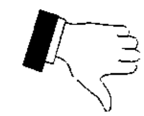
1999. APS Press. 213pp. $59.00 ($69.00 after 1/1/00)
ISBN 0-89054-1973

This is not a compilation of "laws/regulations for countries concerning entry status of any article subject to restriction or quarantine." In reality, this text provides an overview of how diverse governments, institutions, agencies, quarantine services, and societies address the design of quarantine facilities and implementation of safeguards. Chapters involve multiple authors from diverse settings, with each chapter providing a unique perspective on these topics. Terse coverage is presented on the perception of risk associated with exotic plants and other organisms and how risk is managed through the use of containment and various safeguards. Such activities as quarantine of exotics, rearing of beneficials, research into biological control of exotic and domestic pests, quarantine of exotics for in-house research, seed health testing, plant/propagule quarantine, and training are introduced. The text is divided into four sections: I) the background biology and regulatory information relating to quarantine concepts, 2) facilities targeting seed health, 3) facilities targeting plants and propagules, and 4) facilities designed to contain pests/pathogens for research purposes.

Numerous chapters are presented in each of the four sections. The concepts dealing with seed health testing including building plans, structural considerations, and equipment needs are presented for various international research centers such as CIAT, CIMMYT, IRRI, ICARDA, ICRISAT, and ITTA. The modifications and needs for quarantine and various safeguards for plant/propagule handling are similarly presented for such diverse organizations as the National Plant Germplasm Quarantine Center in the U.S. and such countries as Malaysia, Kenya, China etc. The final section deals with the demands for quarantine and other safeguards by research in dealing with plant pathogens. Case studies presented include the University of CA (Riverside) Nematode Facility, the Malaysian Quarantine Insectary, and others.

This text reads well in spite of the diverse authorship among chapters. I suspect the editors and reviewers are to be congratulated on this product. This book provides an interesting insight into the requirements of quarantine and other safeguard procedures in the regulatory setting. This represents a worthwhile addition to the general plant pathology library and to the larger diagnostic libraries that service diagnostic, teaching and research interests.

Walker, J.M., B.J. Ritchie and M. Holderness
Plant Clinic Handbook.
1998. CAB International. 94pp. $28.00
ISBN 0-85198-918-7



Since this book was first advertised in 1995, I have tried to buy it for several years and finally gave up! Last year it came out at last and I was disappointed to say the least. The preface indicates that the text was written to address the needs of setting up plant clinic facilities in developing countries and that the procedures would be useful to many students in plant pathology.

The text defines space needs and equipment but does not meet the needs of diverse pathogen groups or methods. There is a nice treatment of the mental diagnostic checklist in defining processing paths for samples, good instructions on data collection for samples and general instructions on collecting and submitting samples. An overview of symptom categories and types is presented with guidelines on setting up disease surveys. Only the most simplistic methods are presented, including microscope use and alignment, tissue clearing and staining, moisture chamber use, bacterial flow tests, isolation and subculturing, fungal single sporing, sporulation enhancement and dilution plating techniques. A series of appendices follow that include a list of chemicals and hazards of use, a selection of 18 recipes for stains and reagents, eight growth media , and a taxonomic outline of plant pathogenic fungi.

I found this text to be generally incomplete throughout. Suggested equipment did not include a water bath, a spectrophotometer, a centrifuge, or even a hemacytometer although one was referenced later in the text. Methods and procedures to handle nematodes, whether by sieving, centrifugation or Baermann funnel were absent. No mention of specific physiologic tests to identify bacteria to genus, nor the use of hypersensitivity, King's Medium B or Crystal Violet Pectate medium was found. Viruses were advised to be "sent out". No discussion of plant virus inclusions or the commercially available ELISA kits are made. What is equally deficient, was the absence of any discussion dealing with sample quality and quantity, record keeping, turn-around time, and sample replication. Even the reference list had many gaps dealing with taxonomic texts for the Imperfects, Ascomycetes, Coelomycetes, the rusts , and higher Basidiomycetes. Even the Index failed, such obvious entries as bacteria or nematodes do not even appear! This book was long in coming and short in substance when it arrived. The book concept was good, however in its present form it does not represent a valuable addition to the plant disease clinic library.

White, Donald G. (ed.)
Compendium of Corn Diseases. 3rd. edition
1999. APS Press. 75pp. $37.00
ISBN 0-89054-234-1

Another compendium has been revised--should you buy it or not? After going through the text, there has been sufficient improvement in text, images and citations to justify the cost. The most obvious change has been in the upgrading of images. The new edition expands the color plates from 76 to 177 photos, using only ~10 from the second edition and most of these were retouched for color. Most of the line drawings and black and white photos were dropped in the new edition, but were replaced by color images. Areas generally revised with images included the ear rot section, parasitic plants, herbicide induced abnormalities, and physiological problems. Some consolidation of lesser important diseases in the ear rot group and the leaf spot group were condensed into tables for easy use. Several new diseases were added including two downy mildews, Rhizoctonia crown and brace root rot, Fusarium root rot, and red root rot. Both the Glossary and the Index were downsized. The Index was reduced by more than 50% to include just concepts, pathogen nomenclature (with synonyms), and common disease names.

CLASSIFIED

BOOKS FOR SALE

1. Bawden, F.C. Plant Viruses and Virus Diseases – 4th ed. 1964. The Ronald Press Company. 361pp. (some highlighting) $25.00

2. Beal, E.O. A Manual of Marsh and Aquatic Vascular Plants of North Carolina with Habitat Data. 1977. The North Carolina Agricultural Experiment Station. 298pp. $2.50

3. Boyce, J.S. Forest Pathology – 3rd ed. 1961. McGraw-Hill Book Company, Inc. 572pp. $10.50

4. Bulmer, G.S. Medical Mycology. 1978. The Upjohn Company. 91pp. $2.50

5. Christensen, C.M. Common Edible Mushrooms – How to Identify and Cook 45 Varieties. 1943. The Lund Press, Inc. 124pp. $4.50

6. Converse, R.H. Virus Diseases of Small Fruits – Ag. Handbook No. 631. 1987. U.S. Department of Agriculture Agricultural Research Service. 277pp. $10.00

7. Couch, H.B. Diseases of Turfgrasses – 2nd ed. 1973. Robert E. Krieger Publishing Company. 348pp. $6.50

8. Cox, R.S. The Private Practitioner in Agriculture. 1971. Solo Publications. 192pp. $4.50

9. Dahl, M. & T.B. Thygesen. Garden Pests and Diseases of Flowers and Shrubs. 1974. Macmillan Publishing Co., Inc. 223pp. $7.50

10. Darrow, G.M. The Strawberry – History, Breeding, and Physiology. 1966. New York: Holt, Rinehart and Winston. 447pp. $27.50

11. Anon. Difco Manual of Dehydrated Culture Media and Reagents for Microbiological and Clinical Laboratory Procedures – 9th ed. 1953. Difco Laboratories, Inc. 350pp. $5.00

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18. Heald, F.D. Introduction to Plant Pathology – 2nd ed. 1943. McGraw-Hill Book Company. 603pp. $9.50

19. Hepting, G.H. Diseases of Forest and Shade Trees of the United States. Ag. Handbook No. 386. 1971. U.S. Deparment of Agriculture Forest Service. 658 pp. $17.50

20. Holton, C.S. et. al. Plant Pathology – Problems and Progress 1908 – 1958. 1959. The University of Wisconsin Press. 588pp. (cover taped) $4.50

21. Hotson, J.W. Key to the Rusts of the Pacific Northwest. 1934. University of Washington Press. 191pp. $22.50

22. Hubert, E.E. An Outline of Forest Pathology. 1931. John Wiley and Sons, Inc. 543pp. $30.00

23. Lodeman, E.G. The Spraying of Plants. 1916. The Macmillan Company. 399pp. $9.50

24. O'Kane, W.C. Injurious Insects – How to Recognize and Control Them. 1912. The Macmillan Company. 414pp. $7.50

25. Peairs, L.M. Insect Pests of Garden, Farm, and Orchard. 4th ed. 1941. John Wiley and Sons, Inc. 549pp. $12.50

26. Peattie, D.C. A Natural History of Western Trees. 1953. Boston: Houghton Mifflin Co. 751pp. $20.00

27. Pool, R.J. Flowers and Flowering Plants – An Introduction to the Nature and Work of Flowers and the Classification of Flowering Plants - 2nd ed. 1941. McGraw-Hill Book Company, Inc. 428pp. (writing) $4.50

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