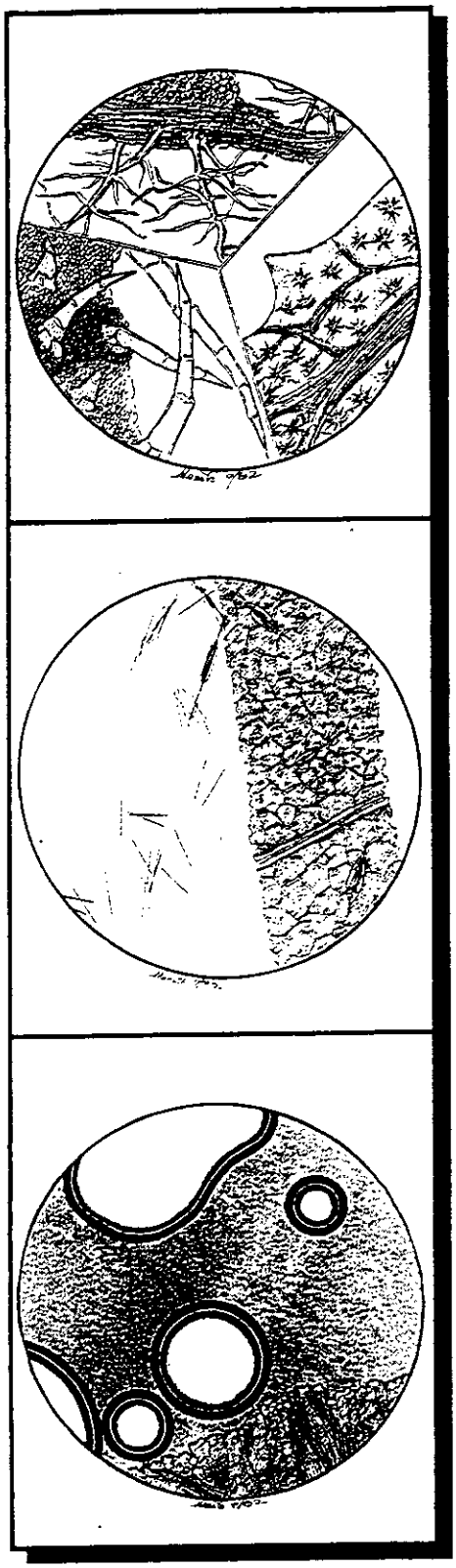

December, 1993
Volume XIV Number 4

PLANT DIAGNOSTICS QUARTERLY

Features

Selected Literature for Ornamental Plant Species

Identifying *Cylindrocladium spp* within the United States

On the cover: Plant trichomes X 450

Plant oxalate crystals X 450

Air bubbles X 450

Illustrations by Merald Clark

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 are:

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Volume XIV, Number 4
December, 1993

PLANT DIAGNOSTICS QUARTERLY

FROM THE EDITOR

The contents of PDQ--1994 need some help! Based upon your comments at the Nashville meeting of the Diagnostics Committee, I have enclosed a chronological and topical index of Feature articles from 1980 - 1993. Those in attendance at Nashville said that these indices would allow them to pick out feature articles for future issues. The indices are included and I await volunteer authors!

PDQ for 1994 will be issued according to the following schedule:

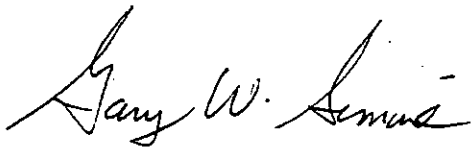
Publication Schedule for PDQ -- 1994

	Issue 1 (March)	Issue 2 (June)	Issue 3 (September)	Issue 4 (December)
Copy Deadline	4/15	7/15	10/14	1/14/95
Editing Deadline	4/22	7/22	10/21	1/21/95
Publication	4/29	7/29	10/28	1/28/95

Contributors for Departments (e.g. Regional Reports, Diffusion, etc) and Features must have their hard copy or disk format into me by the Copy Deadline Date above. Contributions that arrive late will not be included in that issue but instead will be listed as "Unavailable." Please mark your calendars accordingly so that each issue of PDQ will be as complete as possible.

Finally, the stack of available Enclosures for future issues of PDQ is exhausted. If anyone has ~275 copies of a new publication they can share with the readership, please send them to Ms. Gail E. Ruhl (Managing Editor). These can be color, black and white or text only publications of relevance to diagnosticians.

Hope the 1994 year is a challenging year for all of us!



Gary W. Simone
Editor

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PDQ -- Plant Diagnostics Quarterly

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Guidelines to Contributors

Submission Format

Articles are preferred submitted on diskette (5.25 or 3.5) -- especially the longer Feature Articles. Electronic submission will allow greater consistency among type fonts and sizes and improve the appearance of the publication. We use Word Perfect 5.1 on IBM hardware, but have the capability of converting most word processing software. Please send a copy of the article on the software you use (be sure to identify the software); please also send an ASCII file to use in case we have problems with the conversion. Label disks with your name and address and job file name. All disks will be returned. Please include a hardcopy printout as well.

Articles will also be accepted in a hardcopy format by surface mail or FAX. Where secretarial time allows, shorter articles will be retyped. Longer articles, however, may be used camera-ready. Please follow the Manuscript Format instructions that follow.

Manuscript Format

The title of the article is printed in bold letters (mixed case), is placed 1 1/2 inches from the top of the page, and is centered. Skip one line then center your name, then center the institution of your affiliation on the following line. Your name and affiliation should be printed in mixed case.

The top margin will be 1 1/2 inches on the first page and 1 inch for each page thereafter. One inch margins should be used on the remaining sides. Page numbers should be lightly pencilled in at the bottom of each page.

Paragraph or section headings should be in bold print or underlined. Skip the next line and then begin the paragraph; paragraphs are separated by blank lines.

Lines are single-spaced. The article should be printed on a letter quality printer or typewriter; dot printing will not reproduce well and should be avoided.

Latin bionomids should be italicized rather than underscored if possible.

Length

Feature articles should be a minimum of 5 pages. Aside from this limitation, articles may be of any length as long as they remain focused on the topic selected.

Illustrations

Our ability to reproduce illustrations is limited; line drawings reproduce most faithfully. Original black and white photographs (prints only) may be used if they are of high quality. Illustrations should be mounted on a separate page, with their captions mounted below.

Fact Sheets

Contributed Fact Sheets from states extension/research units or other agencies for inclusion with PDQ are gratefully accepted. Send two (2) originals to Gary W. Simone (Editor) for appropriate listing in the next issue. If sufficient copies of the publication are available, send 225 copies to Gail Ruhl -- Managing Editor so that they can be compiled with the issue.

References

Use at your discretion. If articles are referred to in the text, please cite them at the end of your article using a standard format such as that used in Plant Disease. If references are not cited, related articles may be listed under the heading "Bibliography".

REGIONAL REPORTS

NORTHEAST REGION

Richard J. Buckley and Ann B. Gould

The impact of the summer drought this season is still being felt in many locations in the northeast. Samples of woody ornamentals with symptoms of drought stress were examined by most pathologists and diagnostic labs in the region. As can be expected, newly installed landscapes and plants on poor sites were the first to go. Conifers, exhibiting premature discoloration and needle drop, have been especially hard hit. Diagnosticians in Maryland and western New York each commented on the poor performance of spruce in their states. Sharon Douglas in Connecticut noted the high populations of mites on many samples, which are favored by hot, dry conditions.

Pythium root and crown rot of poinsettia was reported by pathologists in Virginia, New Jersey, and New York. Margery Daughtrey suggests that the incidence of this disease in New York was strongly influenced by overdoses of osmocote. Other problems of poinsettia include Fusarium wilt and root rot in New York, and powdery mildew in western New York, Connecticut, and Vermont. Powdery mildew has not been diagnosed in New Jersey or Maryland.

Diseases of other greenhouse crops reported this fall include: anthracnose and Fusarium wilt of cyclamen; root rot of Christmas cactus and fuchsia, caused by the fungus *Phytophthora parasitica*; and downy mildew of snapdragon. Several diagnosticians commented upon the on-going battle with tomato spotted wilt virus in their states.

In Virginia, Mary Ann Hansen reports a very interesting problem in sweet potato. "Corky things" were picked out of the potato after they were cooked. Upon first examination, the structures were thought to be sclerotia of some sort; however, further investigation revealed that the sweet potatoes were infected with a strain of feathery mottle virus. According to Sherf and MacNab's "Vegetable Diseases and Their Control," the feathery mottle complex is a group of diseases that includes internal cork, feathery mottle, and russet crack. These diseases were once thought to be caused by different viruses, but now appear to be caused by different strains of the same virus. Internal cork is characterized by dark brown to blackish corky spots within fleshy roots. Each corky spot is composed of a central region of collapsed cells surrounded by a corky layer several cells thick. Symptoms of this disease are promoted during potato storage when temperatures reach 78 to 80°F. Interestingly, in Mary Ann's case, the injury was not easily identified until after the potato had been cooked.

In earlier regional reports from Connecticut, Sharon Douglas reported widespread incidence of late blight of tomato. Late-August rains were apparently responsible for the out-break. It appears that this epidemic was an excellent inoculum source for infection of the new fall crop of greenhouse-grown tomato. Late blight was evident in greenhouses before the tomatoes were ready to be picked. Late-season infections of *Phytophthora infestans* were also reported in West Virginia tomatoes for the second year in a row.

Pumpkins did not have a disease-free fall. A fruit rot of pumpkin, caused by the fungus *Fusarium solani*, was diagnosed in Virginia, and a high incidence of powdery mildew was reported on pumpkins and other cucurbits in Connecticut. Diseases in other crops included: leaf spot, caused by *Cercosporella brassica* in turnip, and cool temperature phosphorous deficiency in cabbage. In Maryland, soybean anthracnose and soybean pod and stem blight were very common.

Cool-weather turf diseases are active in many parts of the northeast. In New Jersey and New York, yellow patch, caused by the fungus *Rhizoctonia cerealis*, and pink snow mold, caused by *Microdochium nivale*, are a problem on golf course turf. In addition, a high incidence of root-infecting *Pythium* has been reported from several locations. As with other *Pythium* diseases on fine turf, root rotting isolates are more active in turf areas where high soil moisture and poor vigor are common. Brown stripe of orchard grass, caused by the fungus *Cercosporidium graminis* (syn. *Scolicotrichum graminis*), and gray leaf spot of perennial ryegrass were reported from Virginia.

Tim Brown reports that ash yellows has been confirmed in a third county in West Virginia. Oak leaf scorch, caused by *Xylella fastidiosa*, has been diagnosed on red and pin oaks with increasing frequency in southern New Jersey. The presence of the bacterium in the trees was confirmed using commercially available test kits and by microscopic examination of xylem fluid.

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SOUTHEAST REGION

Jackie Mullen

Fall reports from the Southeast indicated the usual drop off in sample numbers (as compared to summer!) and fairly 'normal' occurrences of typical southeastern fall diseases including downy mildews, powdery mildews, Cercospora and Phomopsis leaf spots/blights, pansy root rot diseases, black rot (*Xanthomonas campestris*) pv. *campestris*) on crucifers, Phytophthora and Pythium root rots, and Rhizoctonia stem/root rots. Also, noteworthy Botrytis greenhouse problems were reported from Arkansas and Kentucky. See the individual state reports below for unusual and/or noteworthy disease occurrences or new developments.

In Arkansas, S. Vann reported Cercospora leaf spot on turnip greens was abundant. Also several cases of root knot and a variety of storage rots were observed on sweet potato. Take-all was a common problem on bentgrass. Dollarspot was also commonly seen on bermudagrass golf courses and home lawns. Botrytis was prevalent on greenhouse poinsettias in propagation as well as other production areas. Cedar apple rust was common in southern regions of the state. Steve reported considerable damage to tender landscape plants and widespread defoliation and stem injury of many shrubs and trees due to the first frost in November.

Brian Eshenaur (Kentucky) reported stalk rots of field corn were prevalent this fall. Anthracnose, Diplodia, and Gibberella stalk rots were diagnosed. Black rot was a problem with fall cabbage. Poinsettia problems included Pythium and black root rot. Botrytis blight, prevalent on greenhouse crops during the fall, caused serious damage on geranium and basil crops.

In Tennessee (Beth Long) reported Phytophthora root rot as a problem on many types of nursery and landscape plantings under irrigation. Poinsettia diseases were common and included Pythium and Rhizoctonia stem and root rot. (Overwatering and high fertilizer salts were often associated.) With field crops and commercial vegetables, Beth reported seeing soybeans with SDS (Sudden Death Syndrome) and soybean stem canker; problems of downy mildew on turnip and mustard greens, beginning on September 16; and Phytophthora blight on squash.

In North Carolina, Tom Creswell reported *Xylella* (confirmed by Agdia's ELISA test kits) in pin oak, London planetree, sycamore, and ornamental plum. North Carolina's unusual problems included Cercospora leaf spot on French hydrangea, Sphaeropsis canker on false cypress, Sphaeropsis leaf spot on red-tip photinia, bacterial gall of oleander, Cylindrocladium crown rot of seedling sweet gum and root-knot nematodes on river birch. Cypress canker (*Seiridium unicorne*) continued to be a sporadic problem, primarily in nurseries. Numerous pansy samples from nurseries, and later, from landscapes were diagnosed with nutritional problems, Phytophthora root rot, black root rot, Rhizoctonia root/stem rot and Pythium root rot. Fewer poinsettia samples were seen this year than last but the types of diseases diagnosed (*Rhizoctonia, Pythium*, nutritional) remained the same. Rhizoctonia diseases, often in combination with root-knot nematodes or Pythium or fertilizer injury, were also prevalent in September on bedding plants, perennials, and ground covers. With turf, gray leaf spot (*Pyricularia grisea*) and late season chinch bug injury were seen on St. Augustinegrass. Drought related problems, including soil which had become hydrophobic, continued as a factor on many turf samples. In the area of fruits and vegetables, Phomopsis leaf blight was diagnosed on several strawberry samples. Improper handling following harvest, scurf and Fusarium diseases were the most prevalent problems on sweet potato.

James Blake (Clemson, SC) reported the usual fall disease problems. In addition, Cylindrocladium leaf spot was observed on yaupon holly. Dagger and sting nematode problems were diagnosed on pecan, and Phytophthora root rot was present on blueberry. Also, *Sclerotinia sclerotium* was observed on collards.

Several diseases were identified from greenhouse tomato crops in Mississippi (M.V. Patel). Gray mold, leaf mold, root-knot nematode, bacterial wilt, and Fusarium crown rot diseases were common on tomato. (The greenhouse tomato and cucumber production industry is growing every year in Mississippi. At present, greenhouses cover about 25 acres). Root-knot nematode was a problem in the home garden especially on snapbean, lima bean, and cowpeas. Due to unusual weather conditions, scab on pecan was a major problem in reducing the nut yield. Stem canker and aerial web blight diseases were a major problem on soybeans in some counties of the Mississippi Delta.

On December 1, 1993, the plant pathology department at Mississippi State University was combined with entomology. The new department name is Department of Entomology and Plant Pathology and is headed by Dr. Clarence H. Collison (former head of the Department of Entomology). Agronomy, Horticulture, and Weed Science departments were combined into one department as the Department of Plant and Soil Sciences and is headed by Dr. Richard H. Mullenax (former head of the Department of Horticulture).

Clayton Hollier (Louisiana) reported the following problems to be more prevalent than normal this fall: reniform and root-knot nematodes, and petiole blight (*Phomopsis* sp.) on cotton; leaf scald (*Xanthomonas albilineans*) on sugarcane; leaf blight caused by *Phomopsis* sp. and *Amphobotrys* sp. on poinsettia; and brown patch (*Rhizoctonia*) on turfgrass very late in the season.

In Florida, Gary Simone and Richard Cullen reported that whitefly transmitted geminiviruses continue to be of interest in Florida. This past fall the Florida clinic processed fewer geminivirus samples, but a geminivirus in okra, bean golden mosaic virus in snapbeans, and tomato mottle geminivirus in tomato were identified. Other virus diagnoses of interest were dasheen mosaic and an unidentified potyvirus in calla. Other interesting diseases included: white rust (*Albugo candida*) of mustard , white rust (*Albugo ipomoeae-pandunatae*) of railroad vine, and a pittosporum stem gall (*Nectriella pironii*, anamorph-*Kutilakesa pironii*, both states present).

As of Dec. 1, 1993, the Florida Extension Plant Disease Clinic network instituted a $15 charge per sample at the four clinic sites. The charge is an across the board rate, independent of the technology used in the diagnostic process. Samples from university personnel, government personnel, or county agent service samples are still free of charge. The determination of a county agent service sample is left up to the agent's discretion.

At Athens, Georgia, Wakar Uddin reported that there were considerable pansy losses in greenhouses due to both foliar and root problems. Cercospora leaf spot (often confused with bacterial leaf spots) and Pythium root rot problems were the most damaging with the Cercospora causing problems early in the fall and the Pythium root and stem rot developing later. In 1993, the number of wood samples (from home structure and furniture) infested with the wood-rotter *Poria incarnata* was also higher than in 1992. There was also a significant increase in both the number of corn (grain) samples and the average aflatoxin content per sample in the fall of 1993 compared to 1992. A total of 28 samples were analyzed in UGA-Plant Disease Clinic in the fall of 1992 with the level of toxin from 13 ppb. to 210 ppb. (mean 52.6 ppb.). This past fall of 1993, the corn sample number increased to 49 with a toxin level range of 10-592 ppb (mean 175 ppb.). This increase was apparently due to the dry summer and wet fall conditions of 1993 (favoring A. flavus invasion of young corn plants in the field and later toxin production in the developing kernels).

In Alabama (J. Mullen), the following were fall diseases of significance: many cases of Phytophthora root rot on greenhouse and nursery plants; Cercospora leaf spot on snapdragon (showing bacterial leaf spot symptoms); stem galls of unknown etiology on snapdragon; black root rot and Pythium root rot of pansy; take-all patch (*Gaeumannomyces*) on St. Augustine and zoysia; cucumber mosaic virus, potato virus Y, tobacco etch virus, tobacco mosaic virus, and tomato spotted wilt virus on tomato (confirmed with Agdia ELISA kits); and Cercospora leaf spot problems on turnips, collards.

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CENTRAL REGION

Karen Rane

As is usual for this time of year, there are few problems to report from the Central Region. Most diagnosticians in the region saw outbreaks of bacterial blight of geranium, caused by *Xanthomonas campestris pv pelargonii*. Other greenhouse ornamental problems include Botrytis stem canker on fuchsia (Ohio, Indiana) and powdery mildew of begonia (Minnesota).

Pine and spruce problems appeared to be more frequent this fall across the region. In Ohio, several samples from mature spruce trees were received showing loss of all but 1993 needles. Nancy Taylor has attributed this problem to root stress, but would be glad to hear other possible explanations. Nancy has also received two samples of spruces with "brilliant" yellow needles. A micronutrient problem has been suggested as the cause, but again Nancy is interested in any other ideas from our readers.

Corn ear rots were common this fall. In Nebraska, the corn harvest was completed with significantly lower yields, due to heavy rain and lack of sun during most of the growing season. In Wisconsin, an

increase in storage problems in potatoes was observed. Early frost before harvest, as well as *Fusarium, Rhizoctonia* and early blight all contributed to these storage problems.

Vegetable problems of note this fall include Fusarium rot of pumpkin (Indiana), and root knot nematode in greenhouse tomatoes (Ohio). The cleistothecia of the powdery mildew fungus *Sphaerotheca fuligena* were observed on an unidentified variety of squash in Ohio. Vegetable specialists with many year's experience in that state had never before seen these fruiting structures on squash.

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SOUTHWEST REGION

Steven Koike

Arizona (M. Matheron). At present, the winter vegetable season is in progress. Young cauliflower seedlings were damaged by Pythium root rot and Rhizoctonia stem decay. For the second consecutive season, *Fusarium* and *Pythium* have been isolated from decayed roots of early cabbage plantings (fall season, 1993). However, later plantings (winter) in the same fields did not exhibit such infections. It is suggested that the warm fall soil temperatures provide conditions suitable for the development of these fungi, but cooler winter soil temperatures do not allow this disease to progress. As usual, some lettuce drop (*Sclerotinia minor* and *S. sclerotiorum*) has occurred. Ammonia toxicity on lettuce has also developed in some fields (internal yellowing of root cortex, wilting of the seedling). A sample of onion rust (*Puccinia allii*) was received from the Mexican state of Baja California.

White masses of fungal growth were observed on the soil and trunk of weakened citrus trees in western and central Arizona in late summer. The fungus was identified as *Ceriporia xylostromatoides*, and has been found occasionally in Arizona citrus groves. It is not clear whether this fungus is a pathogen on citrus, or is saprophytic on dead citrus root tissue.

Phymatotrichum omnivorum has been sighted on decayed roots of a rose plant.

California (S. Koike). Lettuce drop (*Sclerotinia minor*) was prevalent during the late season, and continues last year's trend of an apparently increased disease incidence in the coastal region. Bacterial leafspot (*Xanthomonas campestris pv. vitians*) again occurred on leaf and head lettuce varieties. At present, the plant disease situation is relatively uneventful. Some broccoli head rot problems (*Alternaria brassicicola* and several bacteria) have followed some of the winter rains.

Oklahoma (J. Jacobs). A survey for soybean cyst nematode has been conducted in 11 counties in Oklahoma. Soybean cyst nematode was detected for the first time in 5 counties located in the eastern part of the state. Also, pine wilt, caused by *Bursaphelenchus xylophilus* continued to plague urban planted pines this fall in eastern and central Oklahoma. This disease has not yet been detected in Christmas tree orchards or pine forests.

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PDQ (1993) 14(4):12

PACIFIC NORTHWEST REGION

Ellen Bentley

The sample load decreased significantly during September at the WSU-Puyallup Diagnostic Clinic. Carrie Foss reports that disease samples processed currently total 1280. This represents a slight increase over the 1992 sample load and is primarily due to the extended wet, cool weather into August.

Carrie also has been investigating an improved communication system with county offices. An electronic bulletin board would be used for disease diagnosis and insect identification responses, pest alerts, announcements regarding upcoming events, disease fact sheet information, and for directly communicating with specialists regarding disease problems.

Plant Clinic faculty, Art Antonelli, Van Bobbitt, Ralph Byther, and Carrie Foss, will be managing another new project this fall. The Washington Centennial Clean Water Grant program is funding an urban pesticide reduction education project. The project objectives include: 1) a disease diagnosis and IPM training program for pesticide applicators and advanced Master Gardeners, 2) a pictorial manual of common landscape plant problems in western Washington, and 3) an IPM manual containing current information on control strategies for the landscape plant problems.

The Plant Clinic currently is busy with Master Gardener basic training and Pesticide License Recertification lectures. All of these activities will continue through the winter season.

Ellen Bentley (WSU-Prosser) reports a slight reduction in overall Plant Clinic submittals. The clinic was closed for 2 weeks in the spring and the weather was more benign during the early part of the season. Washington state had record grape and potato harvests in 1993. Grape harvest extended past Thanksgiving and many growers had to frost-protect the last weeks. The fall proved to be dry as irrigation systems were shut down early. Mild winter temperatures so far may protect drought-stressed ornamentals and perennials. Some drought-stressed winter wheat was injured by the first hard freezes and most areas currently are without a protective snow cover. Wheat streak mosaic and barley yellow dwarf viruses were confirmed in dryland winter wheat (PCR done by Roy French, USDA, U. Neb). This area had an extensive "green bridge" present when planting began in late August (see hail damage report, Sept PDQ). The prognosis is not good for the coming spring. Powdery mildew and leaf rust was also severe in the late fall.

Onions and garlic have experienced storage problems (neck rot, and surface fungal discolorations and blotch by *Fusarium* and *Penicillium* spp.) due to incomplete post-harvest curing. 'Frontier Russet' potatoes have developed early blight in storage after the tubers were left in the ground for 3-4 weeks after vine kill. Common leaf rust (tentative ID *Puccinia sorghi*) appears to be a state first report on sweet corn. Spinach suffered from oedema in overly wet fields.

White rot was found on jerusalem artichoke and canola. Downy mildew (*Peronospora effusa*) occurred on alfalfa as well as several weed hosts. High counts of root-knot nematodes were recovered in a peppermint field. Verticillium wilt and Phoma black stem were also present.

A commercial rose nursery also sustained serious loss to Verticillium after establishment on old mint/potato ground. Rhizoctonia root rot destroyed potted Corsican mint for landscaping. Many ornamentals suffered from late season powdery mildew.

Fire blight continued in apples. Extensive loss (1,000+ trees) was experienced by a nurseryman who carelessly obtained bud wood from an infected orchard! The clear plastic graft band acted just like a micro moist chamber and collar blight emanated from the graft site on the M26 rootstock liners. Many of the new cultivars are in short supply and these trees were already presold. Haste makes waste!

Several new diseases surfaced in Colorado (Laura Pottorff CSU-Jefferson Co) this past season. In the agricultural arena Barley stripe rust, race 24 was confirmed, while, Rhizomania disease of sugar beets caused by the beet necrotic yellow vein virus was confirmed in eight fields. A new corn virus was also discovered. The virus has been identified as a tenuivirus and is being further identified by Dr. Nancy Robertson in Texas.

In the ornamental area we also had a few exciting finds. Kabatina blight of juniper was found for the first time in eastern Colorado and the needle cast fungus *Davisomycella* appeared on Austrian pine near Boulder, CO. This is the first needle cast we've found in the Denver-metro area.

Aside from these new finds, the rest of the diagnoses made this fall were fairly typical: Pythium and Rhizoctonia root rots of green house ornamentals, *Xiphinema* on greenhouse roses, *Rhizoctonia cerealis*, cool season *Pythium* spp. and pink snow mold on bentgrass greens and necrotic ring spot (*Leptosphaeria korrae*) on Kentucky bluegrass.

Thirty-eight Master Gardeners were trained to work in the Denver-Metro Plant Clinic in 1993. Laura relates that she was extremely pleased with their performance as they diagnosed 50% of the samples (mostly abiotic and insect related). Volunteer help allowed her to pursue a small research project this summer; a survey of greenhouse irrigation sources for *Pythium* and *Phytophthora* spp. *Pythium* spp. were isolated from all holding pond water sources surveyed. A *Phytophthora* sp. was found in one holding pond. Well water and city water sampled were free of *Pythium* and *Phytophthora* spp. Species identification and pathogenicity tests are being conducted this winter.

Samples submitted to the Utah Diagnostic Lab were fairly routine this fall. Karen Flint (USU) reports finding Fusarium fruit rot on ripening cantaloupes in September, a new record for the state. There was more than the usual amount of pink rot and/or leak in potatoes (*Pythium* spp + *Phytophthora erythroseptica*), and millipedes are being blamed for creating large cavities in the surfaces of otherwise healthy tubers. Black stem rust in wheat was also more common this year but is still considered a curiosity rather than a threat.

A net necrosis occurring frequently in home garden potatoes suggested a problem with potato leafroll, and one sample submitted to Agdia tested leafroll positive. However, no growers or county agents reported foliar leafroll symptoms earlier in the season. Leafroll has not previously been an important problem in Utah, but the occurrence of foliar symptoms will be monitored closely next summer.

Sherm Thomson was able to show, by selective fertilization, that a severe chlorosis problem on burning-bush was nitrogen deficiency. The symptoms could be mistaken for iron chlorosis except the chlorosis is overall, not just interveinal. Bushes given supplemental nitrogen held their leaves longer and maintained their brilliant red color later in the fall.

Finally, Karen and Sherm found that a graft union canker of 'Gala' and 'Mutsu' apples on M-9 rootstock was not caused by *Phytophthora*. Instead *Erwinia amylovora* was isolated from the cankers. This "collar fireblight" has destroyed many trees in a new planting.

The Montana (Martha Bamford, MSU) growing season concluded with the following highlights. A Sept. 9 killing frost caused widespread cereal crop damage in many areas of Montana. Due to an very cool, wet summer many crops had not reached the hard dough stage by the time of the frost. Fusarium scab damage was minimal with only 4 wheat fields testing positive for vomitoxin. Wheat streak mosaic virus damage was severe in north-central MT in 1993. We have received several reports of early infection in the 1994 winter wheat crop in this area of the state. Much of this can be attributed to a prevalence of volunteer wheat due to the unusual summer weather.

In Oregon Phil Hamm (OSU-Hermiston) echoes the concern over Wheat Streak Mosaic, as well as Barley Yellow Dwarf viruses. A lot of late harvested corn with early plantings of winter wheat could spell lots of WSM in the spring. Likewise a high population of aphids (oat birdcherry) may be responsible for a high incidence of BYD infection.

Potato late blight continues in storage. Infection frequency is not extremely high but diseased tubers probably could be found in any randomly selected storage. The southern Columbia Basin had a fair amount of late Watermelon Mosaic 2 infected squash plantings as well.

No reports were filed for the Dakotas, Wyoming, Alaska or western Oregon.

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APS UPDATE

by Paul Bachi, Chair-Diagnostics Committee

* Nominations to the Diagnostics Committee by our Committee.

The following persons were nominated to serve on the Diagnostics Committee (starting 94/95) by Paul Bachi (chair) and James Blake (vice-chair): Ellen Bentley (Washington State Univ.), Steve Koike (Univ. of California), Laura Pottorff (Colorado State Univ.), and Cindy Ash (Univ. of Minnesota). In making this request for nominations, we were trying to get more representation for the western portion of the U.S. These persons will not automatically be put on the committee as it is the decision of the Committee on Committees, chair Mary Powellson, and myself who will decide. Other names for nominations were encouraged through recommendation of department chairs or colleagues (were due by December 1). Recommendation forms can be found in the July issue of Phytopathology News.

* Our Committee has submitted the following events for the 1994 annual APS meeting to be held in Albuquerque, NM:
  Workshop - Pythium Identification (Las Cruces, NM)
  Contact Person: Colette Beaupre
  Workshop - Rapid Diagnostic Assays
  Contact Person: Sally Miller
  Discussion - Fastidious Xylem-Inhabiting Bacteria
  Co-sponsor with Diseases of Ornamentals and Turf Committee
  Contact Persons: Jim Sherald and Ann Gould
  Poster - Contact Person: Margery Daughtrey
  Social - Contact Person: Paul Bachi

* Events for the 1995 annual APS meeting in Pittsburgh:
  Teach-In - Abiotic Stress w/ emphasis on air pollution.
  Sponsor: Environmental Quality and Plant Health Committee
  Contact Person: Mike Simini
  *See Mike's request for suggestions on a new publication on the diagnosis of problems caused by environmental factors (e.g. air pollutants, salt spray, etc.) elsewhere in this issue of PDQ.
  Workshop - I was contacted by Rich Baird, Chair-Mycology Committee requesting that our two committees might work together in the future to co-sponsor workshops. Their idea for 1995 is to have a workshop on Coelomycetes. I told Rich we would welcome cooperation as long as our needs were still met. Rich is working on fine tuning the scope of the workshop (more on this as I get word).

* Jackie Mullen and I have been contacted by Gail Schumann about our Committee putting together a slide set on diagnostic procedures and tests. It sounds like a good idea and you will probably see a notice in a future PDQ requesting slides representing specific procedures and tests.

* Expediting permits for movement of virus and virus-infected plants between states. You may have seen the article in the November issue of Phytopathology News by John Hill describing the history and new procedure for granting permits for viruses listed by states as 'endemic and widespread' in their state. If you have not read the article you need to be aware of this movement. Mike Likins and I attended an ad hoc meeting with Matt Royer of PPQ/APHIS and other interested APS members during the annual meeting in Nashville. PPQ/APHIS would like to also see lists of fungi and bacteria developed and is asking APS for help. This could be a big help to labs who send and

receive cultures and infected samples with other labs. I am trying to stay on top of the issue and am planning to write a feature article on this topic for the March 1994 issue of PDQ.

* For all the specifics on the Diagnostics Committee meeting in Nashville, see the Committee Meeting minutes in this issue of PDQ, as submitted by James Blake, vice-chair.

* I plan to have an update for the March and June issues of PDQ as well.

* If there is anything you wish to discuss, please to not hesitate to contact me!

Paul R. Bachi, Plant Diagnostician
UK Research and Education Center
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MINUTES OF THE DIAGNOSTICS COMMITTEE MEETING AMERICAN PHYTOPATHOLOGICAL SOCIETY NASHVILLE, TN, 1993

Introduction

The APS Diagnostics Committee meeting was held on November 5, 1993. The meeting was conducted by Chair Jackie Mullen. There were 44 people in attendance.

I. APS Diagnostics Committee Membership

Jackie Mullen called the roll of the committee. Colette Beaupré, Jan Hall, Karen Rane, Brian Eshenaur, Paula Flynn, Barbara Corwin, Sharon Douglas, James Blake, Bob McGovern, and Paul Bachi were present. Members absent were Jim Sherald and Mike Likins. Members rotating off of the committee at the end of the 1993 meeting are Colette Beaupre, Jan Hall, Karen Rane, and Jim Sherald. These members were thanked for their work on the committee. New members for 1994-96 are Beth Long, Karen Flint, Dave Roberts, and Lauri Kenyon.

II. Amendment to APS Diagnostics Committee Bylaws

Ethel Dutky presented a proposed amendment to the bylaws. The Immediate Past Chair has served as recording secretary for the meeting in the past. The amendment proposed that the minutes of the meeting would be prepared by the secretary as designated by the committee chair. A motion was made by Larry Brown and seconded by Chuck Semer to adopt this amendment. The motion passed unanimously.

III. Election of Vice Chair

The Vice Chair for 1994 will serve as Chair in 1995 at the APS meeting in Pittsburgh, PA. Brian Eshenaur nominated James Blake with a second by Larry Brown. With no other nominations, Chuck Semer moved that nominations cease with a second by Gail Ruhl. The motion passed. James Blake will serve as Vice Chair in 1994 and Chair in 1995. James served as secretary for the 1993 meeting.

IV. Minutes of the Committee meeting in Portland, OR (1992)

The minutes of the Portland meeting were presented by Immediate Past Chair Chuck Semer. The minutes were approved by the committee.

V. Business Session

A. Certification of Plant Pathologists

Chair Jackie Mullen indicated that this program would be further discussed at the APS Private Practice Committee meeting on Sunday morning.

B. Diagnostic Booth

Immediate Past Chair Chuck Semer discussed the diagnostic booth presented at the International Congress of Plant Pathology (ICPP) held in Montreal, Canada from July 28 - August 6, 1993. The booth was on display for 3 1/2 days with approximately 500 of the 1600 registrants stopping by the booth. The poster in the booth highlighted the work of the APS Diagnostics Committee. Gisele Legare was acknowledged for the outstanding art work on the poster. The poster will be on display during the Diagnosticians Reception on Monday evening.

C. Diagnostic Lab Roster

Chet Sutula reported that 13-15 more names have been added to the roster. Chet indicated that this information could be made available on a diskette in D-Base or FilePro format or possibly transferred to other database formats.

D. Diagnostics Committee Sponsored Events

1. Rapid Diagnostic Assays for Plant Pathogens Workshop Chet Sutula reported that there were 6-7 concurrent sessions available during the workshop in Portland. Mary Ann Hansen attended in Portland and indicated that it was a very good workshop. Sally Miller was unable to attend the committee meeting but submitted a memorandum concerning the Nashville workshop. The workshop will be held on Tuesday, November 9, from 1:00-5:00 pm. There will be six concurrent sessions. The workshop has been filled with 70 people. Steve Nameth will serve as chair of the workshop. Sally thanked the subcommittee (Chet Sutula, Melodie Putnam, Larry Brown, and Steve Nameth) for their contributions to the organization of the workshop. It was indicated that Sally has agreed to continue to coordinate the workshop with the help of the Diagnostics Committee.

2. Diagnostics Committee Poster

   The poster for the Nashville meeting was prepared by Paul Bachi and Mike Likins. APS continues to encourage committee posters at the annual meetings. A motion was made and passed unanimously to contribute $50 towards the production of the poster. Bills should be submitted to the chair for reimbursement. Margery Daughtrey volunteered to prepare the poster for the 1994 meeting in Albuquerque, NM.

3. Plant Disease Diagnosis Contest

   Brian Eshenaur thanked Nancy Pataky and Mary Ann Hansen for contributing slides for the contest in Nashville. Volunteers are needed to man the booth during the Nashville meeting. A sign-up sheet was passed around. Brian indicated that 1994 would be the last year that slides would be used for the contest. Beginning in 1995 the APS videodisc would be used. Colette Beaupre and Barbara Corwin volunteered to contribute slides for the contest in 1994.

4. Diagnosticians Reception

   The reception will be held on Monday from 5-7 pm. The poster from the ICPP meeting in Montreal will be on display. The committee decided to continue to sponsor this reception in 1994.

5. Pythium Species Identification Workshop
   The Pythium workshop was conducted on November 5-6, 1993 at the Ellington Agricultural Center in Nashville, TN. There were 38 registrants and 4 instructors. There was a total of 95 applicants. The coordinators were Jackie Mullen, Beth Long, and Paul Bachi. With the large response to this workshop, the committee decided to sponsor the workshop again in 1994 in Las Cruces, NM prior to the APS Annual Meeting in Albuquerque, NM.

E. Diagnostics Committee Account

Chair Jackie Mullen reported a final 1992 balance of $3,449.83. The workshops (Pythium and Rapid Diagnostics Assay) and the reception brought in about $4,561. The expenses for the workshops are not fully known at this time (Pythium slide set costs undetermined) but are estimated to be $2,000-$2,200. The final balance is estimated to be $6,000-6,500.

F. Diagnostic Manual Subcommittee

Chuck Semer reported that there are 225 diagnostic sheets from 55-countries covering 60 different commodities. He hopes for 50 more sheets this year. Final submission to APS Press is scheduled for June 1, 1995. APS Press indicates that a first run of 1,500-2,000 copies with black and white photographs would be sold for $50-80 per copy. The book would be one volume, ring binder, approximately 700 pages with 200 black and white photographs. APS expects a revision would be needed in 3-5 years. Chuck indicated that money is being solicited to defray some of the publication costs to lower the price of the manual to $30-50 or to include color photographs.

G. "Plant Diagnostics Quarterly" (PDQ)

Gail Ruhl reported that there are 173 subscribers, 17 in Canada and 10 overseas. The subscription remains $10 for USA and Canada and $25 for overseas. Back issues are available for $2.50 each plus postage. PDQ remains financially sound. Both Gail and Gary Simone made a plea for feature articles. If you have any fact sheets you would like to contribute to PDQ, send 200 copies to Gail. Gail also thanked Melodie Putnam and Gary Simone for their work: "I would like to acknowledge Melodie Putnam, the immediate past editor of PDQ, for her dedication to maintaining the quality and professionalism of PDQ and also acknowledge and thank Gary Simone for the new leadership he is providing as editor and I look forward to 1994 and a wealth of new information to be shared."

H. "Spotlight on Diagnosis"

Mary Ann Hansen reported that there have been 4 submissions of articles for the last 3 years with only one published. Mary Ann held a conference call with an ad hoc committee (Bob McGovern, Melodie Putnam, Mike Likins, and Colette Beaupre). An active solicitation of articles was suggested as well development of a wish list of potential topics to be published. Broad scope articles on a general topic, or articles on a technique, or an experiment were suggested. Mary Ann will end her term as advisor to Spotlight on Diagnosis in December 1993. Chet Sutula agreed to serve as advisor for 1994.

I. APS Framework for Planning Report, 1993-2000

Jackie Mullen reported that APS is looking at workshops as possible sources of revenue. These workshops will be aimed at non-plant pathologists but should not compete with existing workshops. The regular on-going society workshops for APS members will not be included in this proposed "workshops for profit" APS project. Jackie has suggested that APS should investigate the possibility of publications aimed at less scientific clientele as additional sources of income.

VI. Future Events for Committee Sponsorship

The 1994 APS meeting will be August 6-10 in Albuquerque, NM. The theme for the meeting is "Pro Plant Pathology". The Diagnostics Committee has voted to sponsor the following events.

A. Pythium Species Identification Workshop

Due to the tremendous number of applications for the 1993 Pythium Species Identification Workshop the committee voted to sponsor another Pythium workshop in Las Cruces, NM prior to the 1994 APS meeting. Colette Beaupre and Karen Flint will assist with organization.

B. Plant Pathogens and the Worldwide Movement of Seed Symposium

Marty Draper from the Seed Pathology Committee asked that the Diagnostics Committee cosponsor this symposium. The committee agreed unanimously.

C. Xylem-limited Bacteria Discussion Session

Jim Sherald asked the Diagnostics Committee to sponsor this discussion session. The committee agreed unanimously. The cosponsor will be the Diseases of Ornamental Plants and Turfgrasses Committee.

D. Rapid Diagnostic Assays for Plant Pathogens Workshop

The Diagnostics Committee will again sponsor this workshop at the 1994 meeting. Sally Miller will coordinate with assistance from Chet Sutula, Melodie Putnam, Larry Brown, and Steve Nameth.

E. Diagnosticians Reception

The committee agreed to continue to host the Diagnosticians Reception at the 1994 meeting.

F. Diagnostics Committee Poster

Margery Daughtrey has agreed to prepare the committee poster for the 1994 meeting.

G. Plant Disease Diagnosis Contest

Brian Eshenaur will represent the Diagnostics Committee in organizing the contest with the Teaching Committee.

Respectfully submitted,

James H. Blake
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EVENTS

Pythium Workshop Program
November 5-6, 1993
Nashville, TN

November 5, 8 am -12:00 noon

Welcome and Introduction	Jackie Mullen/Beth Long
Isolation, culture, identification and storage of *Pythium*	Bob Lumsden USDA/ARS Beltsville, MD
Commonly encountered *Pythium spp.* in agricultural production	Joe Hancock Dept. of Plant Pathology University of California Berkeley, CA
Pythium spp. that cause Turfgrass diseases	Gloria Abad Dept. of Plant Pathology N.C. State University Raleigh, NC
Modern Approaches to identification of *Pythium* spp.	Frank Martin Dept. of Plant Pathology University of Florida Gainsville, FL

Catered Lunch, 12:00 noon -1:00 pm

November 5, 1:00 pm - 5 pm

Demonstration of Olympus Microscope equipment (on loan)	Reavis Boyd, President Micro Imaging, Inc Nashville, TN
Hands-on identification of *Pythium* spp.	Workshop Team

November 6, 8:30 am -12:00 noon

Zoospore release demonstration

Demonstration of Computer Software for Pythium identification

Continued hands-on identification of Pythium cultures

Notes taken at:

PDQ (1993) 14(4):21

The APS Diagnostics Committee's

Pythium Workshop

November 5-6, 1993
Nashville, TN

Compiled by Brian Eshenaur, from the notes of Margery Daughtrey, Brian Eshenaur and Jackie Mullen.

Isolation, culture, identification and storage of *Pythium*.
- Bob Lumsden.

Pythium Isolation:

Water Agar Method

1. Thoroughly wash infected tissue in stream of tap water. (Using a screened mason jar works well.)

2. Place washed tissue under a wedge of 2% water agar (WA).

3. Incubate at room temperature for 24 hours. (*Pythium* grows out of wedge to the adjoining portion of the WA, cleaning itself of bacteria.)

4. Transfer hyphal tip plugs to new plates.

5. Drop a sample hyphal tip plug into nutrient broth to determine if there is bacterial contamination. (If contaminated nutrient broth a will appear cloudy in 24 hours.)

Selective Media

Gallic Acid Media (GAM) best for:
P. ultimum
P. paroecandrum
P. mamillatum
P. irregulare

Pimaricin - Vancomycin - Rose Bengal
Selective media for soil assays
best for: *P. aphanidermatum*

Snowblight
- *Pythium aristosporum*

Many *Pythium spp.* may be mycorrhizal
- symbiotic
- hyperparasites

Of the 120 spp. now Identified only 5-6 are heterothalic.

P. arrhenomanes - probably most important *Pythium* on turf in North Carolina.

P. torulosum - these two species are the most commonly
P. catenulatum isolated in North Carolina however they are often hyper-parasites

Modern Approaches to identification of Pythium spp. - Frank Martin.

Media for isolation
- Water agar and Tergitol
- The Tergitol (surfactant) inhibits growth and gives time for isolation the next day.
- Since it inhibits oospore germination, only use this media for isolation.

Serology- ELISA has been worked with, however consistent results have not been achieved.

Cellular Proteins:

Isozyme Analysis - Few markers available to differentiate *Pythium spp.* So morphologically similar spp. are not always distinguishable with this technique.

Another limitation: Protein Banding patterns of an isolate may change with the age of culture.

Molecular Techniques - Now used for basic ecology (rather than for diagnosis.)
- Want area of genome that changes enough to discriminate morphologically similar species, such as *P. arrhenomanes* and *P. graminicola.*

Pythium Culture:

Corn Meal Agar - good general growth media

Autoclaved Plant Tissue - *Pythium spp.* need the sterols in plant tissue (such as grass blades and corn kernels) for oospore production.

One method for oospore production: Place culture plug on top of autoclaved plant tissue in center of WA plate.

Pythium Identification:

Keys

Matthew 1931
Middleton 1943 - Torry Botanical Club
Waterhouse 1967
Van der Plaats - Niterink 1981 - Netherlands
Dick 1990
Abad Shew et. al. 1994 - APS press, planned for publication in 1994.

Pythium Terminology:

Oogonial

acrogenous - at the tip

androgynous - antheridia & oogonia originating from same hyphae

aplerotic - not filling space

echinulate - spiny

inspissate - thickened

plerotic - filling space

Antheridial

adnate - closely attached

allantoid - sausage-shaped

amphigynous - antheridium which envelopes oogonial stalk

diclinous - antheridial stalk from

monoclinous - antheridial stalk from same hyphae as oogonia

Sporangial

catenulate - chain like form

dactyloid - finger shaped

digitate - finger shaped

intercalary - growth between the apex and the base

toruloid - swollen sections

Mycelial

appressorium - flattened tip of hyphae which is attached to substrate. (Not in most keys but is useful to note.)

helicoid - spiral shaped

heterothalic - self-sterile or self-incompatible. Individuals requiring two compatible mating types for sexual reproduction.

homothalic - self-fertile or self-compatible. Sexual reproduction can take place in a single thallus.

Pythium Storage

- Use a weak medium and maintain at room temperature.

Example: - Corn meal agar plugs with mycelium, stored in sterile tap water in sealed screw-top test tubes can last 2-3 years at room temperature.

(Variations that work in long term storage: add autoclaved hemp or millet seeds or wheat leaves to sterile water.)

Bacterial contamination is often a problem on solid media. Thus it is hard to maintain *Pythium* or solid media longer than a couple of months.

May lose virulence over time. To revive: pass through plants and recover.

May lose ability to produce sexual state after long term storage. To help restore capacity retrieve onto autoclaved grass leaves and water.

Commonly Encountered *Pythium* spp. in Agriculture Production- Joe Hancock.

Approximately 120 species, probably 100 more need to be described.

To determine which *Pythium* species is causing the problem in question:

- Need to study the whole fungus.
- Host index is of little value here since there is not a lot of specificity in *Pythium*.
- Appreciate diversity - work with a number of isolates
- Realize sometimes dozens of species involved and some are likely secondary invaders.

Some important Pythium sp.:

P. aphanidermatum - (worked with a lot)
P. irregulare -(up and coming / seeding rots / cool temp.)
P. splendens - (seeing more / more significant than Phytophthora cinnamomi on eucalyptus)
P. ultimum - (lab rat / biocontrol / stored products)
P. violae - (more recent attn. / carrots)
P. arrhenomanes
P. graminicola
P. intermedium
P. myriotylum

Seeding diseases - Probably the most important set of diseases caused by *Pythium spp.*

Pre-emergence - Fields with **poor stands** are often the result of *Pythium spp.* killing seedlings. (Non-plant pathologists often fail to recognize this as a disease problem.)

Post-emergence - Easier to I.D. - Less common / feeder tap roots tap root infection rare once roots mature. *Pythium* will often trigger adventitious multiple root formation. The unusual root formation normally does not occur like this with *Pythium* or *Rhizoctonia.*

Examples:

- *Pythium aphanidermatum* - reason sugar beets can't be grown in Arizona.
- *Pythium violae* - attacks carrot's feeder root and can cause taproot cavity rot.

Root nibblers - *Pythium spp.* are largely not much of a problem on field crops after the roots are nicely developed.
- Primarily attack small feeder rots.

Annual Population Variations:
- Enormous variation occurs through the year with the *Pythium spp.* that will be prominent.

Example : *Pythium ultimum* is more likely in hot weather.
P. violae / P. irregulare are more likely in cool season.

Pythium infection of feeder roots

Factors influencing infection
- Site (Soil temperature, cropping history, soil fertility)
- Soil moisture and temperature
- Root growth dynamics (*Pythium* blooms when roots grow)

Quantifying
Number of colonies per root length
- salt solution to get clay particles off
- roots blotted dry
- placed on selective media such as PARP(H)

Note : Plain water agar tends to select for fast growers so selective media is good to use in some situations.

Pythium spp. that cause Turfgrass diseases -
Gloria Abad.

Bentgrass and cool season grasses are most susceptible. *Pythium* can destroy large areas of turf over night with high temperatures and high humidity.

Pythium Blight
- 1-12 inch spots which may coalesce
- leaves appear water soaked
- cottony mycelium often present

Pythium Crown/Root Rot
- caused by 33 different spp.
- 30 spp. from bentgrass
- most from any host

Two regions of genome have received attention. (Present in high copy.)

1. Ribosomal DNA (genes for the production of ribosomal RNA)- internal transcribed ITS units have power for seeing slight changes. Spacer sequences have no evolutionary constrains. This is where differences in strains would appear.

2. Mitochondrial DNA - Can digest with restriction enzymes. Comparison of these mitochondrial DNA restriction patterns may be useful for classification of hard to identify isolates. Sequencing and looking for base changes may help answer evolutionary questions.

For population studies one technique is RFLP -(Restriction Fragment Length Polymorphism). Probe to look for banding patterns with particular marker. It may be possible to find one that gives pattern associated with virulence.

PCR (Polymerase Chain Reaction) amplifies fragments that might be diagnostic. Plasmids can be very specific for an individual isolate. *P. oligandrum* has many.

RAPD's - Random Amplified Polymorphic DNA.(Must have pure and carefully controlled concentrations of DNA.)
PCR based. Look for random chance that it might anneal. Look for fragments generated. May get isolate or species specific fragments. Can get either band present and may mean one of four things:

1. There is an insertion or deletion in rest.
2. One of primary annealing sites isn't there.
3. Single base change has occurred.
4. The fragment is unique in what we are looking for. (In the *P. oligandrum* he's studying, out of the 25 bands 3 or 4 were isolate specific. He has tried 50 primers in *P. aphanidermatum* and hasn't found any.)

For diagnosis DNA extraction slow process
Colony hybridization
PCR amplify ITS1 or ITS2 region with restriction enzymes can separate some species. Some primers work on all fungi. Potential Problem: can get amplified plant DNA or other pathogens. If one band distinguishes can clone sequence, then make 20 base pair primer. Then amplify sans ultra-purifying etc. in 3-4 hours. Some tissues inhibit DNA polymerase so it is hard to use this technique for DNA.

Discussion by the workshop presenters on specific *Pythium* species. Discussion was lead by Gloria Abad.

P. dissotocum - cool temperature pathogen/ problem in hydroponics and flooded, alfalfa.
- infrequent oospores are plerotic "bullseyes".

P. dissimile - rare. - filiform sporangia oospore has small refringent body.

P. aphanidermatum - warm temp fungus cottony leak of cucurbits.
- intercalary antheridium.

P. torulosum - frequently isolated from turfgrass and wheat but **not** a virulent pathogen.
- large convoluted sporangia

P. vanterpoolii - predominately found on grasses, pathogenicity variable.

P. graminicola - antheridia have very long stalks, fewer antheridia than *P. arrhenomanes.*

P. tardicrescens - similar to *P.graminicola* and lobulate sporangia.

P. polycarpum - very uncommon. - catenulate oospore.

P. periilum - oospores have multiple antheridia, spherical sporangia in chain (up to five).

P. aristosporum - multiple antheridia as individuals, in contrast with *P.myriotylum* has double oogonial wall and complex sporangia.

P. myriotylum - can be a major pathogen in some areas such as southeast coast, can cause seed rot damping off and blights, often a greenhouse problem.
- complex, massive branching sporangia.

P. volutum - highly pathogenic on wheat.
- lobate sporangia, antheridia in circles around oogonial stalk.

P. arrhenomanes - sugar cane pathogen, closely related to *P. graminicola.*
- oospores with multiple antheridia, oospores can be rare, may be in Group T if not present

P. plurisporium - newly named Pythium species, isolated in North Carolina, not pathogenic.
- multiple oospores.

P. pulchrum - spherical sporangia, aplerotic oospore with wide distance between spore walls.

P. ultimum var. ultimum - antheridium very close to oogonium, spherical sporangia intercalary or terminal, focus on kidney shape.

P. rostratum - oogonia are intercalary (two or more).

P. iwayamai - snow mold of turf, wheat.

P. paroecandrum - frequent as *P. ultimum*, oospores often catenulate.

P. pyrilobum - oogonia pyriform, spherical sporangia.

P. intermedium - heterothalic, spherical sporangia in chains.

P. sylvaticum - chrysanthemoid colony in culture plates, also heterothalic, some isolates make oospores, some don't. when paired some have strong reaction, some have weak.

P. catenulatum - parasitizes roots of aquatic weeds.
- catenulate sporangia, heterothalic

P. carolinianum - cold temperature one-half hour then room temperature to produce vesicles.

P. oligandrum - famous for mycoparasitic abilities, widely isolated from dead tissues, not pathogenic to plants.
- oogonia has short projections

P. irregulare - most frequently isolated in clinics, pathogenic to many hosts,
- some projections on some oogonia,. long falcate antheridia

P. spinosum - fairly common, pathogenic to grasses.
- oospores have spiny walls.

P. violae - frequently isolated but often confused with *P.ultimum*, pathogen of pansy roots and carrots.
- spores are a little larger, aplerotic with a large space between oogonial walls.

Discussion continued:

Culture:

Water agar- good media for *Pythium spp.*

Water agar with Tergitol- although it selects for fast growers, this media can allow separation based on colony morphology.

PAP and PARP - good selective media.

Note: Many *Pythium* spp. are sensitive to Streptomycin Sulfate.

Baits:

Autoclaved **beet seeds** and **cotton leaf disks** can be effective.

Long term storage:

Some weaker isolates do best on CMA slants covered with sterile mineral oil.

Lyophilization works best with isolates that produce numerous oospores.

EVALUATION QUESTIONNAIRE / ANSWERS
PYTHIUM SPECIES IDENTIFICATION WORKSHOP
UT ELLINGTON CENTER NASHVILLE, TN NOVEMBER 5-6, 1993

(31 questionnaires were turned-in).

1. In my present position I am affiliated with (please circle just one)

Private/Commercial	Extension	University teaching/research	State/Regulatory
4	18	8	1

2. I am a ... plant pathologist 24 technician 2 grad. student 1

On the scale of 1 - 5 (1=poor, 2=fair, 3=good, 4=very good, 5=excellent), please rate the following:

3. My competency in the identification of *Pythium* species before the workshop was

	1	2	3	4	5	
response	16	10	4	1	0	N=31 Ave.=1.68

4. My competency in the identification of *Pythium* species after the workshop is

	1	2	3	4	5	
response	0	10	15	6	0	N=31 Ave.=2.87

5. The content of material covered in the workshop was

	1	2	3	4	5	
response	0	1	5	10	15	N=31 Ave.=4.26

6. The clarity of the material covered in the workshop was

	1	2	3	4	5	
response	0	1	4	13	12	N=30 Ave.=4.20

7. The length (i.e. duration in hours) of the workshop was

	1	2	3	4	5	
response	1	3	7	9	11	N=31 Ave.=3.84

8. The benefit/cost ratio of the workshop was

	1	2	3	4	5	
response	2	0	1	7	21	N=31 Ave.=4.45

9. The cost of the workshop (registration=$100.00) was (please circle just one)

too little	adequate	too much
1	30	0

...if registration was $200.00

too little	adequate	too much
0	13	17

...if registration was $300.00

too little	adequate	too much
0	1	30

- more hands-on work. - the instructor should have a prepared slide & go through the key w/ the class using the TV monitor. - sample isolates to be taken home should have been prepared in tubes ahead of time. - this will ensure correct samples to be taken home. - this will allow more time for the participant to concentrate on hands-on work.

More space/larger room. Making the slides [35mm] available was fantastic!

A room with more space & chairs that can be height-adjusted. Have a few species growing on several different media & different selective media to compare growth habit.

handouts with diagrams & descriptions of species to be observed

very well organized; good choice of speakers who covered a broad base of topics

excellent job; wonderful organization. Better set up for projecting slides but it was o.k.

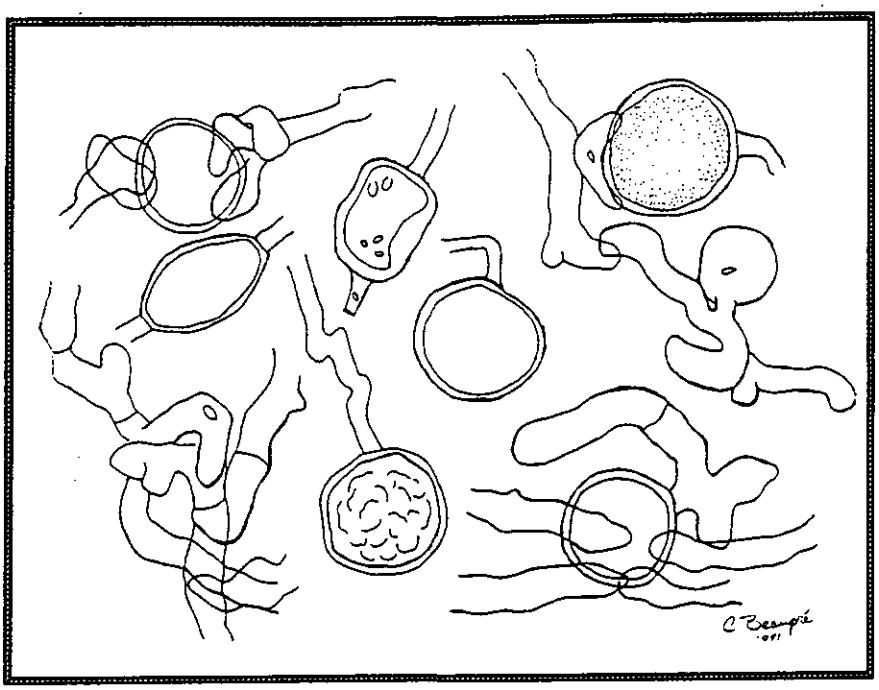
was very good!! - maybe a few more handouts (ex. which species tend to have unique growth characteristics on plates; selective media, isolation, culture storage). Thanks for the slide [35mm] opportunity! Have a video screen set up w/ an instructor pointing out features of species (can get in flow of slides from students that are preparing slides).

Thank you, it was great

I feel that species were pretty much limited to those found in the southeast of the country - would have appreciated a better balance. Instructors & planners of the workshop were very helpful. Only improvement I can think of would be for each participant to have a scope.

It was excellent. Perhaps ask participants ahead of time if they would like to purchase a key & then provide them for those who pay, or have more keys available. Overall-excellent (snacks & lunch & drinks & directions & everything was super!!! A list of pathogenic Pythium species & predominant crops affected by them would have been helpful - also geographical ranges (like we got from Dr. Tsao for Phytophthora workshop). However - thanks for a super job to all - instructors & those who put this together!

Thank you for completing the evaluation questionnaire!
Jackie Mullen
Beth Long
Paul Bachi



REGISTER NOW FOR THE PYTHIUM SPECIES IDENTIFICATION WORKSHOP 1994

The *Pythium* Species Identification Workshop held prior to the APS meeting in Nashville (November 7-11, 1993) was such a success that the APS Diagnostics Committee has agreed to again offer this workshop.

The *Pythium* Species Identification Workshop 1994 is being scheduled for August 5-6, 1994. This one and one-half day workshop will occur just prior to the APS meeting in Albuquerque (August 6-10, 1994). The location of the workshop will be at New Mexico State University at Las Cruces. Workshop instructors (Drs. Natalie Goldberg, Joe Hancock, Craig Liddell, and Mike Stanghellini) will present information on the major pathogenic *Pythium* species encountered in this country, isolation techniques and species identification by classical (microscopic study in culture) methods. About half of the workshop time (or more) will be spent on species identification (practical lab experience!).

Registration for this workshop will be limited to 30 participants due to facilities and the nature of hands-on activity. First consideration will be given to those who were unable to participate in the 1993 *Pythium* Species Identification Workshop. The registration fee is $100. In order to proceed with the workshop plans, we will need to have registration applications and fees by June 1, 1994. Applications will be accepted on a 'first come, first serve' basis, so don't wait until the deadline to register. Make checks payable to American Phytopathological Society. Mail registration form below and check to Colette Beaupré, Plant, Soil and Insect Sciences Department, University of Wyoming, P.O. Box 3354, Laramie, Wy 82071.

Workshop arrangements coordinators are Colette Beaupré, Karen Flint, and Craig Liddell.

****

Pythium Species Identification Workshop 1994
Registration

Name _____

Address _____

Phone Area Code ( ) _____

FAX Area Code ( ) _____

Internet or Bitnet (Please circle) _____

****

If you plan to bring back some *Pythium* cultures to your lab, be sure to fill out the USDA application for transfer permit to your state. The following *Pythium* species will be present at the Workshop: *irregulare, ultimum, aphanidermatum, myriotylum, paroecandrum, arrhenomanes, tardicresens, aristosporum, splendens, sylvaticum, multisporum, vanderpoolii, graminicola, torulosum, oligandrum, acanthicum, spinosum, violae and catenulatum.*

This notice will also be 'posted' in the April and May 1994 issues of Phytopathology News.

PDQ (1993) 14(4):34

Project: The publication of a diagnostic key for environmental pollutants, request for suggestions.

January 28, 1994

During the past year or so, several diagnosticians, extension specialists, and private practitioners have brought to my attention the need for good pictorial publications for the diagnosis of visible plant injury caused by environmental stresses. Symptoms caused by nutrient toxicities and deficiencies on a vast number of species appear to be well described in recent publications. However, books illustrating and describing visual symptoms caused by environmental pollutants (i.e. gases, salt spray and runoff, and herbicide drift) either don't compromise all types of plants (i.e. crops, forest trees, native species) or they are out-dated.

I would like to publish, preferably through APS Press, a pictorial atlas of environmental pollution injury on crop, forest, and native species that is tailored to the needs of diagnosticians, county extension agents, extension specialists and private practitioners. I envision a publication that is along the lines of a diagnostic key in which the user can quickly and easily identify the symptoms. High quality color photographs, as well as lists of tolerant and sensitive species for each pollutant are essential. Inclusion of symptom description on native bioindicator species would be helpful for proper diagnosis. If feedback to the project is positive, I will be asking for good slides from many sources.

I am seeking a consensus of professionals in your field to determine the need for such a publication, and if so, I would like to know the format and content you would like to see. Please offer suggestions regarding types of pollutants and species that are most commonly submitted to your clinics. Also, if you do not agree that symptoms of nutrient stresses are adequately described in the literature, please let me know.

In addition to this project, I will be chairing a Teach-in on diagnoses of abiotic plant diseases co-sponsored by the Environmental Quality and Plant Health, Diagnostics, and Private Practice Committees at the APS meeting in Pittsburgh in 1995. I would like to make this a "hands on" presentation with live specimens. I plan to publish the proceedings of this session, with color photographs, in Plant Disease. Suggestions for topics and speakers for this season are welcome.

Please send suggestions/comments to:

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Phone: (410) 671-4698:FAX: (410) 671-4846 / 2081
E-mail: MXSIMINI@C-MAIL.APGEA.ARMY.MIL

FEATURES

Selected Literature for Ornamental Plant Species

A.R. Chase

African Violet

1. Roberts, B. 1977. Susceptibility of certain *Saintpaulia* species and cultivars to bacterial blight. Plant Dis. Rep. 61:1048-1050

2. Strider, D.L. 1978. Reaction of African Violet cultivars to *Phytophthora nicotianae* var. *parasitica*. Plant dis. Rep. 62:112-144.

3. Strider, D.L. 1979. Evaluation of Melodie and Optimara African Violets for resistance to phytophthora rot. Plant Dis. Rep. 63:382-384.

4. Strider, D.L. 1980. Resistance of African violet to powdery mildew and efficacy of fungicides for control of the disease. Plant Disease 64:188-190.

Aphelandra

1. Chase, A.R. 1981. Comparison of *Myrothecium sp.* and *Corynespora cassiicola* leafspots on two cultivars of *Aphelandra squarrosa* nees. Proc. Fla. State Hort. Soc. 94:115-116.

Begonia

1. Chase, A.R. 1992. Resistance of some Rex begonia cultivars to Xanthomonas leaf spot. Southern Nursery Digest 26(11):20-21.

2. Strider, D.L. 1975. Susceptibility of Rieger elatior begonia cultivars to bacterial blight caused by *Xanthomonas begoniae*. Plant Dis. Rep. 59:70-73.

3. Strider, D.L. 1978. Reaction of recently released Rieger elatior begonia cultivars to powdery mildew and bacterial blight. Plant Dis. Rep. 62:22-23.

Cactus

1. Chase, A.R. and J.M.F. Yuen. 1993. Susceptibility of *Schlumbergera truncata* cultivars to four plant pathogens. J. Environ. Hort. 11:14-16.

Calathea

1. Chase, A.R. 1987. Susecptibility of *Calathea* sepcies and cultivars to *Bipolaris setariae*. J. Environ. Hort. 5:29-30.

2. Chase, A.R. 1993. Bacterial leaf spot and blight of calatheas. Univ. of Fl., IFAS, Central Florida Research and Education Center-Apopka, Research Report RH-93-11.

Chrysanthemum

1. Byrne, T.G., A.H. McCain and T.M. Kretchun. 1980. Testing chrysanthemums for disease resistance. Calif. Agric. 34(11,12):14-15.

2. Englehard, A.W. 1969. Observations on cultivars of commercial Chrysanthemums to Ascochyta blight, rust and three petal spot diseases. Proc. Fla. State Hort. Soc. 82:340-343.

3. Engelhard, A.W. and R.O. Magie. 1972. Occurrence and susceptibility of chrysanthemums to leaf rust in Florida. Plant Dis. Rep. 56:939-941.

4. Engelhard, A.W. and S.S. Woltz. 1971. Fusarium wilt of chrysanthemum: Symptomatology and cultivar reactions. Proc. Fla. State Hort. Soc. 84:351-354.

5. McCain, A.H., T.G. Byrne and T.M. Kretchun. 1988. Disease Resistance. Plant Diagn. Q. 9(4):48-56.

6. Strider, D.L. 1985. Fusarium wilt of chrysanthemum: Cultivar susceptibility and chemical control. Plant Disease 69:564-568.

7. Strider, D.L. 1985. Fusarium wilt of chrysanthemum: Pathogen-free rooted cuttings and susceptibility of new cultivars. Plant Disease 69:836-838.

8. Strider, D.L. 1985. Resistance of chrysanthemum cultivars to Fusarium wilt: A compilation. North Carolina Flower Growers Bulletin 29(4):1-5.

9. Woltz, S.S. and A.W. Engelhard. 1971. Physiological disorders of leaves of chrysanthemum cultivars relative to accumulation of excess carbohydrate. Proc. Fla. State Hort. Soc. 84:370-374.

Crabapple

1. Benson, D.M. and B.I. Daughtry. 1993. Disease response of selected crabapples in North Carolina, 1988-1992. Biological and Cultural Tests 8:127.

2. Benson, D.M., B.I. Daughtry and R.K. Jones. 1991. Crabapple cultivar response to foliar diseases, 1988-1990. Biological and Cultural Tests 6:106.

3. Bonn, W.G. and D.C. Elfving. 1986. Response of crabapple cultivars to fire blight, 1985. Biological and Cultural Tests 1:68.

4. Bonn, W.G. and D.C. Elfving. 1987. Response of crabapple cultivars to blossom blight caused by *Erwinia amylovora*, 1986. Biological and Cultural Tests 2:61.

5. Bonn, W.G. and D.C. Elfving. 1989. Response of crabapple cultivars to fire blight, 1988. Biological and Cultural Tests 4:81.

6. Bonn, W.G. and D.C. Elfving. 1990. Response of crabapple cultivars to fire blight, 1989. Biological and Cultural Tests 5:92.

7. Hartman, J.R., B. Clinton and R. McNiel. 1988. Reactions of flowering crabapple cultivars to foliar disease, 1987. Biological and Cultural Tests 3:81.

8. Hartman, J.R., B. Clinton and R. McNiel. 1989. Reactions of flowering crabapple cultivars to foliar disease, 1988. Biological and Cultural Tests 4:79.

9. Hartman, J., J. Doney and R. McNiel. 1991. Reactions of flowering crabapples to spring frost and to foliar diseases, 1990. Biological and Cultural Tests 6:107.

10. Hartman, J.R., B.S. Kennedy and R. McNiel. 1990. Reactions of flowering crabapple cultivars to foliar diseases, 1989. Biological and Cultural Tests 5:91.

Croton

1. Chase, A.R. 1985. Bacterial leaf spot of *Codiaeum variegatum* cultivars caused by *Xanthomonas campestris pv. poinsettiicola*. Plant Pathol. 34:446-448.

Dogwood

1. Britton, K.O. 1993. Evaluation of cultivar resistance to dogwood anthracnose, 1992. Biological and Cultural Tests 8:128.

2. Windham, M.T., R.N. Trigiano and D.A. Brown. 1993. Dogwood anthracnose resistance of *Cornus* species. American Nurseryman 178(6):91.

Dieffenbachia

1. Chase, A.R. and F.W. Zettler. 1982. Dasheen mosaic virus infection of dieffenbachia cultivars. Plant Disease 66:891-893.

2. Chase, A.R. and R.J. Henny. 1989. Susceptibility of 12 *Dieffenbachia* cultivars to *Xanthomonas campestris pv. dieffenbachiae*. Foliage Digest 13(2):1-2.

Dracaena

1. Chase, A.R. 1993. Fusarium leaf spot of Dracaenas-resistance of species and cultivars. Univ. of Fla., IFAS Central Florida Research and Education Center-Apopka, Research Report RH-93-10.

Euonymus

1. Chase, A.R. 1983. Two foliar diseases of *Euonymus* spp. Foliage Digest 6(1):14.

2. Chase, A.R. 1985. Euonymus anthracnose - influence of cultivars, shade level and increased disease pressure. Commercial Fern Grower 8(5):1-2.

Ficus

1. Chase, A.R. and R.W. Henley. 1993. Susceptibility of some *Ficus* species and cultivars to *Xanthomonas*. Southern Nursery Digest 27(6):20-21.

Geranium

1. Chagnon, M.-C. and R.R. Belanger. 1991. Tolerance in greenhouse geraniums to *Pythium ultimum*. Plant Disease 75:820-823.

2. Dunbar, K.B. and C.T. Stephens. 1992. Resistance in seedlings of the family Geraniaceae to bacterial blight caused by *Xanthomonas campestris pv. pelargonii*. Plant Disease 76:693-695.

3. Hausbeck, M.K., C.T. Stephens and R.D. Heins. 1987. Variation in resistance of Geranium to *Pythium ultimum* in the presence or absence of silver thiosulphate. HortScience 22(5):940-944.

4. Knauss, J.F. and J. Tammen. 1967. Resistance of Pelargonium to *Xanthomonas pelargonii*. Phytopathology 57:1178-1181.

5. Stephens, C.T. and J. Tuinier. 1989. Disease symptomatology and variation in susceptibility of seed-propagated hybrid geranium varieties to *Xanthomonas campestris pv. pelargonii*. Plant Disease 73:559-562.

6. Strider, D.L. 1982. Susceptibility of geraniums to *Pseudomonas solanacearum* and *Xanthomonas campestris pv. pelargonii*. Plant Disease 66:59-60.

Hedera

1. Osborne, L.S. and A.R. Chase. 1985. Susceptibility of cultivars of English Ivy to two-spotted spider mite and Xanthomonas leaf spot. HortScience 20(2):269-271.

Hibiscus

1. Chase, A.R., L.S. Osborne, J.M.F. Yuen, and B.C. Raju. 1987. Effects of growth regulator chlormequat chloride on severity of three bacterial diseases on 10 cultivars of *Hibiscus rosa-sinensis*. Plant Disease 71:186-187.

2. Semer, C.R., IV and B.C. Raju. 1985. Phytophthora leaf blight of hibiscus, a new disease caused by *Phytophthora parasitica*. Plant Disease 69:1005-1006.

Honeylocust

1. Kennedy, B.S., J.R. Harman and D. Potter. 1990. Reactions of honeylocust cultivars to Thyronectria canker, 1989. Biological and Cultural Tests 5:93.

Kalanchoe

1. Strider, D.L. 1976. Resistance of Kalanchoe to powdery mildew and efficacy of fungicides for control of this disease. Plant Dis. Rep. 60:45-49.

Lily

1. Doss, R.P., G.A. Chastagner and K.L. Riley. 1986. Screening ornamental lilies for resistance to *Botrytis elliptica*. Scientia Hortic. 30:237-246.

Marigold

1. Styer, D.J. and R.D. Durbin. 1981. Influence of growth stage and cultivar on symptom expression in marigold, *Tagetes sp.*, infected by *Pseudomonas syringae pv. tagetes*. HortScience 16(6):768-769.

2. Worf, G. and R. Weidman. 1987. Bedding plant reactions to white mold, 1982. Biological and Cultural Tests 2:62.

Phlox

1. Daughtrey, M., M. Macksel, L. Perry and S. Clark. 1993. Comparison of phlox cultivars for susceptibility to powdery mildew, 1991-1992. Biological and Cultural Tests 8:129.

Poinsettia

1. Engelhard, A.W. 1986. Poinsettia cultivar susceptibility to alternaria blight, 1985. Biological and Cultural Tests 1:69.

2. Engelhard, A.W. 1988. Poinsettia germplasm: Reaction of 26 cultivars to alternaria blight and scab, 1987. Biological and Cultural Tests 3:94.

3. Engelhard, A.W. 1989. Reaction of poinsettia germplasm to alternaria blight, 1988. Biological and Cultural Tests 4:84.

4. Engelhard, A.W. 1990. Reaction of poinsettia germplasm to Sphaceloma, 1988. Biological and Cultural Tests 5:95.

5. Krizek, D.T. and P. Semeniuk. 1983. Differential sensitivity of seventeen poinsettia cultivars to sulfur dioxide in relationship to bract color. J. Amer. Soc. Hort. Sci. 108(1):47-49.

Rhododendron

1. Benson, D.M., B.I. Daughtry and R.K. Jones. 1991. Botryosphaeria dieback in hybrid rhododendron, 1986-1990. Biological and Cultural Tests 6:108.

Rose

1. Hagan, A. and J. Mullen. Control of powdery mildew on ornamentals. Alabama Cooperative Extension Service/Auburn University, AL. Diseases and Nematodes Fact Sheet, Circular ANR-407.

2. Hagiladi, A. and O. Ziv. 1986. Use of antitranspirants for control of powdery mildew on field grown roses. J. Environ. Hort. 4:65-78.

3. Horst, R.K., S.O. Kawamoto, and L.L. Porter. 1992. Effect of sodium bicarbonate and oils on the control of powdery mildew and black spot of roses. Plant Disease 76:247-251.

4. Powell, C.C. 1986. Controlling rose diseases. Extension Plant Pathology, Ohio State Univ. T&S-28.

5. Watkins, J.E., D.H. Steinegger and J.A. Christensen. 1986. Reaction of rose cultivars to black spot and powdery mildew, 1980-1982. Biological and Cultural Tests 1:70.

Salvia

1. Chase, A.R. 1994. Resistance of Salvia cultivars to Corynespora leaf spot and stem rot, 1993. Biological and Cultural Tests 9:(in press).

Spathiphyllum

1. Henny, R.J. and A.R. Chase. 1986. Screening *Spathiphyllum* species and cultivars for resistance to *Cylindrocladium spathiphylli*. HortScience 21(3):515-516.

Syngonium

1. Chase, A.R. 1994. Resistance of Syngonium cultivars to Myrothecium leaf spot and Xanthomonas blight. Biological Cultural Tests 9:(in press).

Vinca

1. Chase, A.R. 1993. Resistance of Vinca cultivars to Phytophthora aerial blight and Rhizoctonia stem rot, 1992. Biological and Cultural Tests 8:130.

2. Chase, A.R. 1994. Resistance of Vinca cultivars to Alternaria leaf spot, 1993. Biological and Cultural Tests 9:(in press).

Zinnia

1. Jones, J.J. and D.L. Strider. 1979. Susceptibility of zinnia cultivars to bacterial leaf spot caused by *Xanthomonas nigromaculans fsp. zinniae*. Plant Dis. Rep. 63:449-453.

2. Logan, A.E., F.W. Zettler and S.R. Christie. 1984. Susceptibility of *Rudbeckia, Zinnia, Ageratum*, and other bedding plants to Bidens mottle virus. Plant Disease 68:260-262.

3. Sleesman, J., D.G. White, and C.W. Ellett. 1973. Bacterial leaf spot of zinnia: a new disease in North America. Plant Dis. Rep. 57:555-557.

4. Strider, D.L. 1976. An epiphytotic of bacterial leaf and flower spot of zinnia. Plant Dis. Rep. 60:342-344.

PDQ (1993) 14(4):41

Identifying *Cylindrocladium* spp. Within the United States

N. E. El-Gholl and T. S. Schubert[1]

Species of *Cylindrocladium* frequently have been reported as plant pathogens. Because of misidentifications, name changes, and synonymies, a key based on easily observable morphological features of the described *Cylindrocladium* spp. known to occur in the U.S.A. is proposed.

Evaluation of anamorphs is made on carnation leaf (5 X 5 mm)/water agar and/or peanut-stem (4-6 cm long)/water agar incubated at room temperature (25 $\pm$ 2° C) under ambient laboratory conditions and examined after 7 to 10 days. This insures typical and consistent fungal morphology.

Cylindrocladium spp. known to occur in the U.S.A.

C. avesiculatum Gill, Alfieri & Sobers, Phytopathology 61:60, 1971 (*Calonectria avesiculata* Schubert, El-Gholl, Alfieri & Schoulties, Canadian Journal of Botany 67:2415, 1989, teleomorph).

C. citri (Fawcett & Klotz) Boedijn & Reitsma, Reinwardtia 1:57, 1950.

C. clavatum Hodges & May, Phytopathology 62:900, 1972 (*Calonectria clavata* Alfieri, El-Gholl, & Barnard, Mycotaxon 48:206, 1993, teleomorph).

C. floridanum Sobers & Seymour, Phytopathology 57:392, 1967 (*Calonectria kyotensis* Terashita, Transactions of the Mycological Society of Japan 8:124, 1968, teleomorph).

C. heptaseptatum Sobers, Alfieri & Knauss, Phytopathology 65:333, 1975.

C. leucothoeae El-Gholl, Leahy, & Schubert, Canadian Journal of Botany 67:2530, 1989.

C. parasiticum *Crous, Wingfield, & Alfenas, Mycological Research 97:892, 1993 (*Calonectria ilicicola* Boedijn & Reitsma, Reinwardtia 1:58, 1950, teleomorph).

C. pteridis Wolf, Journal of the Elisha Mitchell Scientific Society 42:59, 1926 (*Calonectria pteridis* Crous, Wingfield, & Alfenas, Mycotaxon 46:228, 1993, teleomorph).

C. scoparium **Morgan, The Botanical Gazette 17:191, 1892 (*Calonectria morganii* Crous, Alfenas, & Wingfield, Mycological Research 97:706, 1993, teleomorph).

C. spathiphylli Schoulties, El-Gholl, & Alfieri, Mycotaxon 16:268, 1982 (*Calonectria spathiphylli* El-Gholl, J.Y. Uchida, Alfenas, T.S. Schubert, Alfieri & Chase, Mycotaxon 45:296, 1992, teleomorph).

C. theae (Petch) Subram., Hyphomycetes. An account of Indian species, except Cercosporae:730-732, 1971 (*Calonectria theae* Loos, Transactions of the British Mycological Society 33:13-18, 1950, teleomorph).

* *Cylindrocladium parasiticum*, a new name for *C. crotalariae*. *Calonectria ilicicola* = *Calonectria crotalariae* (Loos) Bell & Sobers, Phytopathology 56:1364 (1966).

**According to Crous, Alfenas, and Wingfield (Mycological Research 97:701-708, 1993), *Cylindrocladium ellipticum* Alfieri, Seymour, & Sobers (Phytopathology 60:1213, 1970) should be a synonym of *C. scoparium*.

[1]*Plant Pathologists, Division of Plant Industry, Florida Department of Agriculture & Consumer Services, P.O. Box 147100, Gainesville, FL 32614-7100.*

Key

avesiculate (acicular) to narrowly clavate vesicles, conidia 1-septate	*C. avesiculatum* (Fig. 1)
vesicles obovoid to spathulate, conidia 1-3 septate	*C. citri* (Fig. 2)
vesicles sphaeropedunculate[1]	
- lateral filaments present conidia 1-septate (29-)41(-59)X(3-)4(-5.3)µm	*C. floridanum* (Figs. 3 & 4)
- conidia 1-3 septate (45-)62-79(-107)X(4.5-)6(-7.2) µm	*C. parasiticum* (Fig. 5) (=*C. crotalariae*)
capitate[2] vesicles dominant	*C. spathiphylli* (Figs. 6 & 7)
vesicles clavate	
- conidia 1-septate 28-72X3.2-5.6 µm vesicles (3-)4.4(-5.5) µm wide	*C. clavatum* (Fig. 8)
- conidia mostly 1-septate 61-121X4.8-7.5µm, frequently longer than 100 µm vesicles 5.4-7.5 µm wide	*C. pteridis*
- conidia 1-3 septate	*C. theae*
- conidia up to 7 septa	*C. heptaseptatum*
vesicles oval to ellipsoidal and umbonate[3]	
- conidia 1-septate	*C. scoparium (=C. ellipticum)* (Figs. 9-11)
- conidia 1-6 septate	*C. leucothoeae* (Fig. 12)

1 The bases of sphaeropedunculate vesicles are tapered and gradually merge with the filaments as illustrated by (Snell, W.H., and E.A. Dick. 1971. A glossary of mycology. Revised edition. Harvard University Press, Cambridge, Massachusetts. 181 pp.). The tops of sphaeropedunculate vesicles are also frequently flattened.

2 Capitate vesicles are spherical and appear to expand abruptly from the filaments as illustrated by (Hawksworth, D.L., B.C. Sutton, and G.C. Ainsworth. 1983. Ainsworth & Bisby's dictionary of the fungi, seventh edition. Commonwealth Mycological Institute, Kew, Surrey, England. 445 pp.)

3 As illustrated by [Peerally, A. 1991. The classification and phytopathology of *Cylindrocladium* species. Mycotaxon 40:332 (Fig. 6 j&m)].

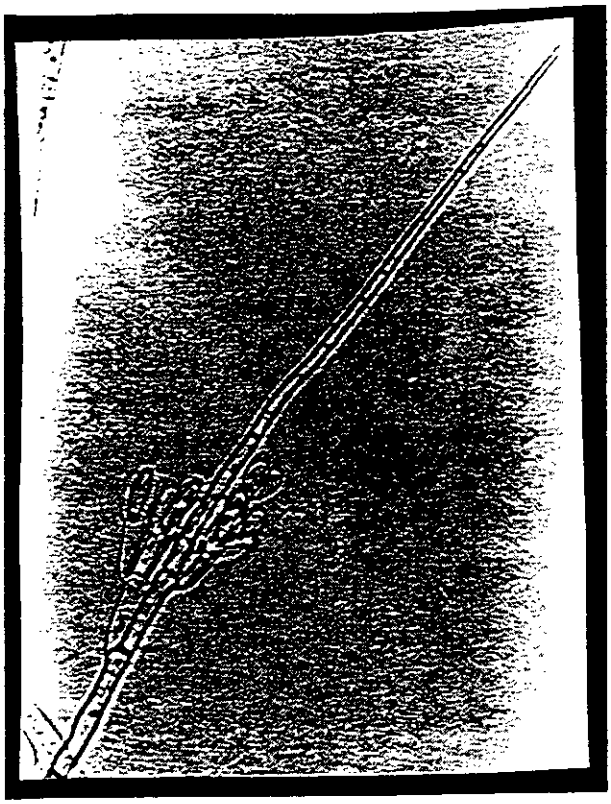

Fig. 1. *Cylindrocladium avesiculatum,* avesiculate filament. X 578.

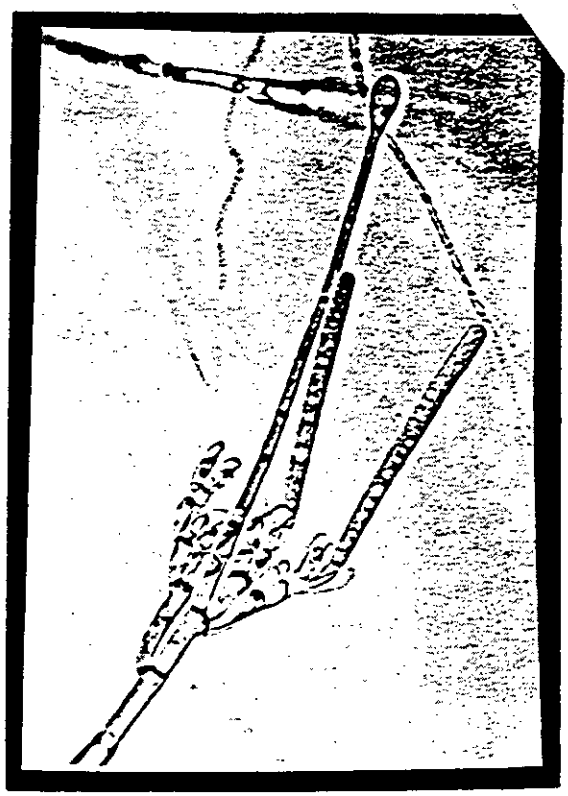

Fig. 2. *Cylindrocladium citri,* vesicles obovoid to spathulate. X 578.

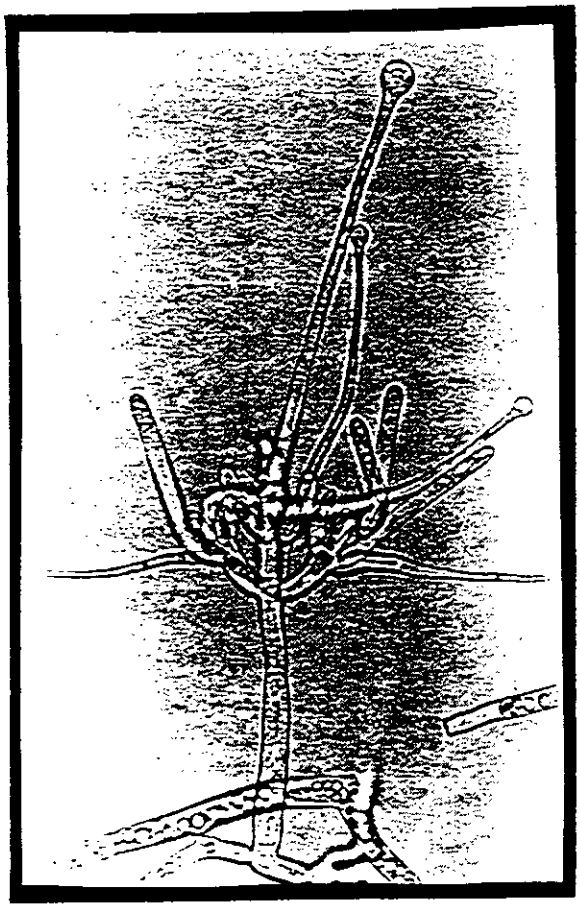

Fig. 3. *Cylindrocladium floridanum*, main and lateral filaments with sphaeropedunculate vesicles. X 578.

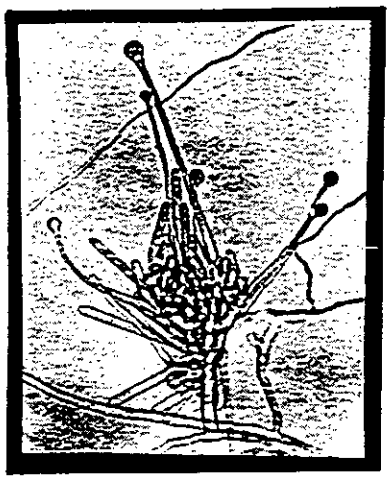

Fig. 4. *Cylindrocladium floridanum. X 289.*

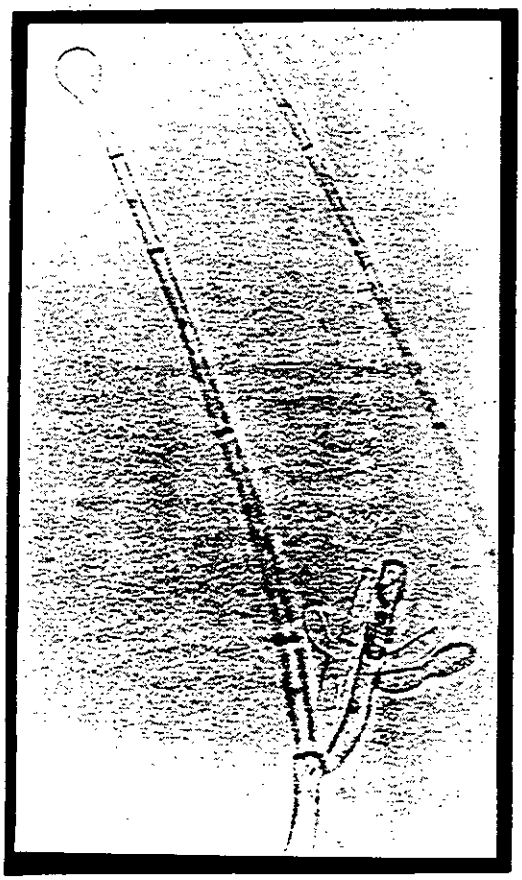

Fig. 5. *Cylindrocladium parasiticum*, vesicle sphaeropendunculate. X 578.

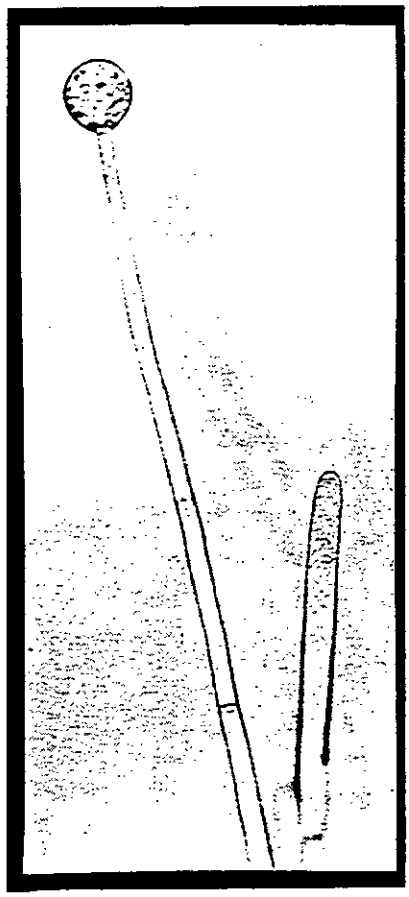

Fig. 6. *Cylindrocladium spathiphylli*, vesicle capitate. X 578.

Fig. 7. *Cylindrocladium spathiphylli*, vesicle capitate. X 289.

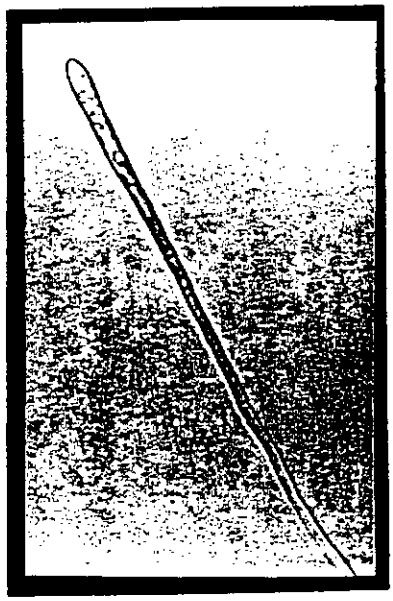

Fig. 8. *Cylindrocladium clavatum*, vesicle clavate. X 578.

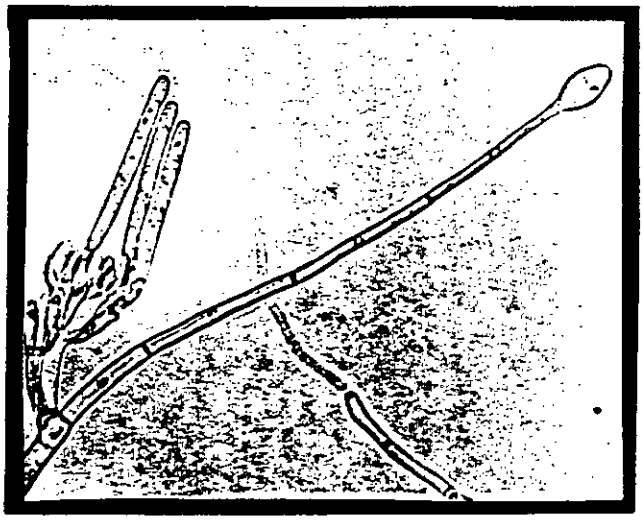

Fig. 9. *Cylindrocladium scoparium* vesicle oval to ellipsoidal. X 578.

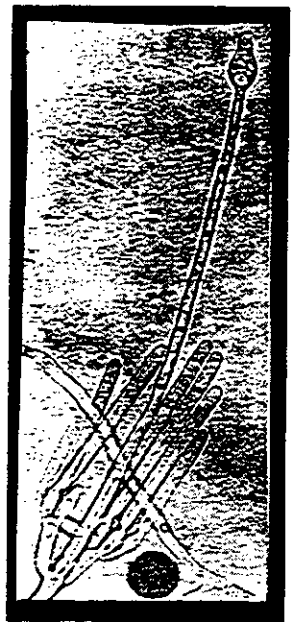

Fig. 10. *Cylindrocladium scoparium,* vesicle umbonate. X 578.

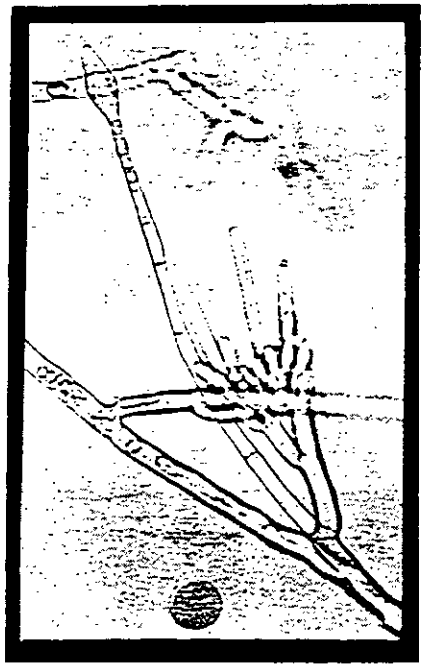

Fig. 11. *Cylindrocladium scoparium,* vesicle umbonate. X 578.

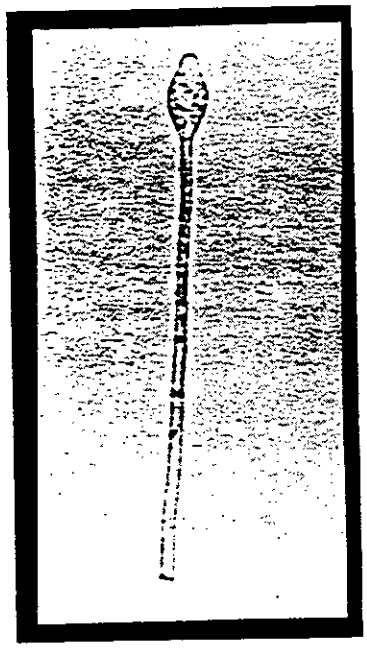

Fig. 12. *Cylindrocladium leucothoeae,* vesicle umbonate. X 578.

PDQ - CHRONOLOGICAL FEATURE INDEX (1980-1993)
G.W. Simone

PDQ - FEATURE INDEX -- (1980-1993) BY SUBJECT AREA

G.W. Simone

Diseases - Vegetable

Fungicides

Herbarium

Master Gardening

Mycotoxins

Pathogens - Bacteria

Pathogens - Fungal

OFF THE SHELF

Atlas, Ronald M. (Edited by L.C. Parks).
Handbook of Microbiological Media.
1993. CRC Press Inc. 1079 pp. ~$90.00
ISBN:0-8493-2944-2

I viewed a title like this from CRC Press and under $100.00 to be a purchase I couldn't pass by. To have an up-to-date recipe book on growth media for microbes - a fantasy! I now have this book, have held this book but am disappointed in its relevance to the Plant Disease Clinic. I took the normal list of growth media used in Florida and began checking the index for entries Although many of the bacteriological media were there, the entries for culture of fungi fell short. There was no listing for Flower's Medium nor a similar medium under *Rhizoctonia*. In fact the only Rhizoctonia medium listed included the fungicide Dexon™ by Chemagro - a fungicide obsolete by over a decade by a company that has underwent at least two name changes since those days! Next I tried Pythium and Phytophthora media. No entries for *Pythium* spp. at all. The Phytophthora medium was a corn meal agar with PCNB, vancomycin, and pimaricin. No mention of thiamine, hymexazol (Tachigaren), or the ampicillin/rifampin substitution for vancomycin (more economical) in the standard Phytophthora medium.

An Agricultural Library will find this text useful - a diagnostic lab much less so. If you are a general microbiologist, this text will be invaluable for the media collected. It includes all media used by the ATCC and the FDA. It also lists product availability from major media producers (with catalog numbers) such as BBL, Difco and Oxoid Unipath. For its utility in the diagnostic lab, one or two trips to the agriculture library should do it!

Cooper, J.I.
Virus Diseases of Trees and Shrubs
2nd edition. 1993. Chapman & Hall. 209 pp. ~$50.00
ISBN 0-412-47220-1

When the first edition of this text was published, it represented the only compiled database dealing with viral diseases of woody plants. The only problem with the first edition was that it was poorly advertized as available from the Institute of Terrestrial Ecology in Cambridge. This revision has solved this problem through publishing by Chapman & Hall Press. The second edition has expanded its coverage of diseases of viral etiology to approximately 100 genera of trees and shrubs - mostly of ornamental significance rather than fruit crops. The text is an alphabetical treatment by plant genus of viral or virus-like disorders that covers symptoms, distribution, transmission, and causal agent/relationship ending with an excellent reference list of citations. Approximately four dozen color and black & white illustrations accompany this text to illustrate particular viral diseases. If I had to cite a disadvantage of this title, it would be the insufficient number of illustrations. In view of cost of photographs in a hardback title and their availability for these obscure diseases of woody plants, I'm more than satisfied with what is presented.

Green, S.K. and J.S. Kim

Characteristics and Control of Viruses Infecting Peppers:A Literature Review.

1991. Technical Bulletin No. 18. Asian Vegetable Research and Development Center. 60pp. $10.00. ISBN 92-9058-045-3

(Available from Winrock International Agribookstore (703)525-9455)

This technical bulletin is one of those difficult resources to come across. It packs a lot of information into a small space in a very organized manner. Seventeen viral families are reviewed for their importance to pepper with over 300+ literature citations. In addition to the five plate pages, there are three excellent appendices that summarize a wealth of information. Appendix 1 reviews the viruses infecting pepper by family, name, particle size, vector, geographical distribution, host range and relevant citations. Appendix 2 summarizes the occurrence of specific viruses in pepper in south and east Asia (with full citations). Appendix 3 summarizes the symptoms caused by 10 common viruses across 13 natural or indicator hosts. Those clinics with a frequency of pepper crop samples and viruses will find the appendices and citations quite handy.

CLASSIFIED

OFFERING - Back issues of unbound Phytopathology and Plant Disease Reporter/Plant Disease for the cost of postage. Some issues are faded, insect nibbled/stained, or otherwise used but may fill in gaps for some journal collection supporting a diagnostic facility. I can't bear the thought of dumping these contributions from retired faculty at the University of Florida. Surely there is a bibliophile out there somewhere to give these journals a home. If interested, contact:

Gary W. Simone
Plant Disease Clinic
P.O. Box 110830
Gainesville FL 32611-0830
Phone: (904) 392-1795:FAX: (904) 392-3438:BITNET: EXTPPCLINIC@IFASGNV

Phytopathology

1989 - 1 each Jan., Apr., May, June, July, Sept. October
1988 - 1 each Jan. & Dec.
1987 - 2 complete years
1986 - 1 complete year
1 each - Jan., Apr., May, Aug, & Dec.
2 each - June, Oct. November
1985 - 1 complete year
3 each January
1 each Feb, Mar., April, May, June
1984 - 2 complete years
1 each - Feb, March, July
2 each May, June, Sept., Oct. Nov. Dec.
3 each August
1983 - 2 complete years
1 each Jan. Apr., July, October
1982 - 3 complete years
1 each Jan., Mar.
3 each Apr., May, June, Aug., Sept., Oct. Nov., Dec.
1981 - 2 each Jan.
1 each Mar., Apr., May, June, July, Aug., Sept., Oct., Nov., Dec.
1979 - 1 complete year
2 each Feb.
1 each Mar., Apr., June, July,
1978 - 2 each Jan.
1 each Feb., March, June, July, Sept., Oct., Nov., Dec.
1977 - 1 each Jan. through June, Aug. through Dec.
1976 - 1 each Jan. March through Dec.
2 each Apr., July, Sept.
1975 - 1 complete years
1 year (missing March)
1974 - 1 complete year
1 each Feb. - Nov.
1973 - 2 years (missing June)
1969 - 1 complete year
1968 - 1 year (missing November)
1 each Jan. - Sept.
1967 - 1 each Jan. June, Aug.
1966 - 1 complete years
1965 - 1 complete years
1 year (missing April)
2 each Dec.
1964 - 2 complete years
1 each Jan, April, June - Dec.
1962 - 1 complete year
1960 - 2 complete years
1959 - 1 complete year
1958 - 2 complete years
1957 - 2 complete years
1956 - 2 complete years

Plant Disease Reporter/Plant Disease

1957 - 1 complete year
1 each Jan., Mar, May through July
1958 - 1 complete year
1959 - 1 each January through April,
1961 - 1 complete years
1 each Feb., Mar., Apr., July through November; 3 Index

1962 - 2 complete years
1 each Jan. through November;
1 extra July
1963 - 2 complete years
1 each Feb, April, June,
Sept., Nov., Dec.
3 January
1964 - 2 complete years
1 each Jan., Feb., Mar., Oct., Nov.,
Index
2 July
1965 - 1 complete year
1 each January through July
1966 - 1 complete year
2 years missing January
1967 - 2 complete years
1 extra Dec.
1968 - 2 complete years
1 March, May through Oct.
1969 - 2 complete years
1970 - 3 complete years
1 Apr. through June, July,
Aug. Oct. Nov. Dec.
1971 - 2 complete years
2 August
1972 - 1 complete year
1 January through June,
August through Index
1975 - 1 Jan, Feb., April through Aug.,
November, Index
1976 - 1 year (missing October)
1 each Feb through May, November,
2 Index
1977 - 3 complete years , 1 Index
1978 - 3 complete years
1 March through Index, 1 October
1979 - 3 complete years
1 January through July, Oct. through
Dec., 1 extra December
1980 - 1 complete year
2 January, 1 May

Plant Disease
1981 3 complete years
1982 3 complete years
1983 1 complete year
1 year missing July
Extra January, June
1984 2 Complete years
1 January
1985 1 complete year
1 January - July
1986 1 February, 1 December

BOOKS FOR SALE!

1. Booth, C. The Genus Fusarium. 1971. Kew, Surrey, England: Commonwealth Mycological Institute. 237pp. $30.00
1a. Brodie, Harold J. The Birds Nest Fungi. 1975. Toronto: Univ. of Toronto Press. 199pp. $22.50
2. Eckstein, Oscar, A. Bruno, and J.W. Turrentine. Potassium Deficiency Symptoms. 1937. Berlin: Verlagsgesllschaft für Ackerbau. 235pp. $24.50
3. Hepting, George H. Diseases of Forest and Shade Trees of the United States. 1971. U.S.D.A./Forest Service Hdbk. 386. Washington, D.C.:Superintendent of Documents. 658pp. $15.00
4. Jayne, Richard A. (ed). Handbook of North American Nut Trees. 1969. Knoxville, TN: Northern Nut Growers Association. 421pp. $20.00
5. Pirone, P.P. Tree Maintenance. 1959. New York:Oxford University Press. 483pp. $15.00
6. Raper, K.B. and D.I. Fennell. The Genus Aspergillus. 1973. New York: R.E. Krueger Pub. Co. 686pp. $35.00
7. Raper, K.B. and C. Thom. A Manual of the Penicillia. 1968. New York:Hafner Publishing Co. 875pp. $35.00
8. Smith, Wm. H. Tree Pathology:A Short Introduction. 1970. New York:Academic Press. 309pp. $32.50
9. Thom, C. and K.B. Raper. A Manual of the Aspergilli. 1945. Baltimore:Williams & Wilkins Co. 373pp. $30.00
10. Walker, J.C. Plant Pathology 1st ed. 1950. New York:McGraw-Hill Book Co. 699pp. $25.00
11. Waksman, Selman A. Principles of Soil Microbiology. 1927. Baltimore:Williams & Wilkins Co. 897pp. $12.50

These are used books representing out-of-print titles or editions of titles. All are in good condition without page underlining, torn pages, or damaged bindings. Some have dust covers. If interested, call G.W. Simone at (904) 392-1795 or FAX to (904) 392-3438. All prices include shipping.

DIAGNOSTICIAN NEEDED

Diagnostician to operate plant diagnostic clinic for woody landscape plants. MS required in plant pathology with undergraduate degree or experience in urban forestry or horticulture. Knowledge of California plant material helpful. Salary commensurate with experience. Send resume to:

Dr. Bruce Fraedrich
Bartlett Tree Research Laboratories
13768 Hamilton Road
Charlotte NC 28278

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COOPERATIVE EXTENSION SERVICE

DIVISION OF AGRICULTURE • OKLAHOMA STATE UNIVERSITY
Department of Plant Pathology • 110 Noble Research Center
Stillwater, Oklahoma 74078-9947 • (405) 744-5643

PLANT DISEASE DIAGNOSTICIAN

(ASSISTANT STATE EXTENSION SPECIALIST)

Nontenure track position

EDUCATIONAL REQUIREMENTS:

M.S. in Plant Pathology or closely related field, or recent Ph.D. graduates seeking a three-five year extension experience.

BASIC QUALIFICATIONS:

- Training and/or experience in plant problem diagnosis required.
- Strong background and/or experience in nematology desired.
- Strong background and/or experience in horticulture crops desired.
- Effective oral and written communication skills required.
- Managerial and supervisory experience is desired.
- Strong interest in Extension and in design and implementation of educational programs.

RESPONSIBILITIES:

- Administratively responsible to the Department Head of Plant Pathology.
- Direct, supervise, and prioritize the daily activities and long-term development of the Plant Disease Diagnostic Laboratory. The incumbent will be responsible for receiving, cataloging, and diagnosing plant specimens with timely follow-up, recording and reporting of diagnoses.
- Supervise a staff which will include a part-time secretary, seasonal lab assistants, and graduate student trainees.
- Provide training and assistance to county agents, Master Gardeners, pesticide applicators, urban clientele, and others in areas of diagnosis and home garden and landscape diseases.
- Work cooperatively with state Extension specialists in developing and implementing multidiscipline activities.
- Revise and write new Fact Sheets and other Extension publications on home garden and landscape diseases.
- Continue professional growth and development through professional improvement activities and membership in professional organizations.

APPLICATION:

Applications accepted until April 29, 1994 or until a suitable candidate is found. Position available August 1, 1994. Applicants should send a resume, transcripts, statement of professional goals, and three letters of reference to:

Dr. Larry Singleton, Search Committee Chair
Department of Plant Pathology
Oklahoma State University
Stillwater, Oklahoma 74078-9947
(405) 744-5643
FAX: (405) 744-7373

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