

PLANT DISEASE DIAGNOSTIC LABORATORY:

**INFORMATION PACKET
FOR
COUNTY EXTENSION OFFICE
PROCEDURE MANUAL**

Educational programs of the Kentucky Cooperative Extension Service serve all people regardless of race, color, age, sex, religion, disability, or national origin.

UNIVERSITY OF KENTUCKY, KENTUCKY STATE UNIVERSITY, U.S. DEPARTMENT OF AGRICULTURE, AND KENTUCKY COUNTIES, COOPERATING

AGRICULTURE & NATURAL RESOURCES • FAMILY & CONSUMER SCIENCES
4-H/YOUTH DEVELOPMENT • COMMUNITY & ECONOMIC DEVELOPMENT

**Plant Disease Diagnostic Laboratory:
Information Packet for County Extension Offices**

Table of Contents

UK Plant Disease Diagnostic Laboratory - General Information.	3
Submitting Plant Samples	4
Tips for Packaging Plant Specimens	6
Soybean Cyst Nematode Samples	8
Walk-in Policy	10
"Where to Send What" Guide to UK Agricultural Diagnostic Services.	12
Extension Plant Pathologists -Diagnosticians / Technicians - Administrators:	
Phone/FAX Numbers, Areas of Specialty	
Plant Disease Diagnostic Laboratories Mailing Addresses.	13
Publications.	14
Plant Pathology (PPA) and Plant Pathology Fact Sheets (PPFS)	14
APS Compendia of Plant Diseases.	20
Herbaceous Ornamental References	21
Nursery and Arborist References	23
Fruit References	25
Vegetable References	26
Training Opportunities, Videotapes, and DVDs	28
Plant Pathology Terms	29

Revised: December 2008

General Information

Location of Laboratories

The Plant Disease Diagnostic Laboratory is part of the Department of Plant Pathology at the University of Kentucky. The Lexington facility is located at the end of the greenhouse structure which is behind the Agricultural Science Center-North. The facility in western Kentucky is in the main building at the UK Research and Education Center in Princeton. Where you send your samples depends on your county's proximity to one or the other of the laboratories.

Main purpose:

Confirming agent diagnoses and diagnosing difficult/complex disease problems.

The main purpose of the Laboratory is to act as a back-up to County Extension Agents and Extension Specialists by confirming their diagnoses and assisting in the diagnosis of their clients' more difficult or complex disease problems. Our Laboratories are equipped to perform a number of special tests which can be used to confirm a diagnosis. In addition, we are able to consult with the Extension Specialists in Plant & Soil Sciences, Entomology and Horticulture when necessary. In the case of certain virus diseases, we work closely with the research faculty in Plant Pathology. The Plant Pathologists at Princeton have special expertise in solving soybean cyst nematode and Asian soybean rust problems.

Training agents to recognize common disease problems.

The Laboratories also help train County Extension Agents to recognize the more common and obvious disease problems. Whenever possible, Agents who come to the Laboratories with samples are advised on key diagnostic symptoms which will allow them to identify the same problem on their own. For other Agents, this learning process takes place after receiving the diagnostic report and supplementary information through the mail. For more training opportunities see [page 28](#).

Kentucky Pest News (KPN) - Current disease situation in Kentucky

Another purpose of the Diagnostic Laboratories is to identify new and recurring disease problems in the State. Through the [Kentucky Pest News \(KPN\)](#) [weekly during the growing season, biweekly off-season], agents are kept abreast of the current disease situation in Kentucky. As you learn about disease problems that have appeared in other areas of Kentucky, you will be better equipped to handle questions as they come up in your county.

Digital Consulting System

The [Digital Consulting System](#) is a web based program to submit a question about plant problems or pest identification to a member of the University of Kentucky. After you login (via CATPAWS login id and password) on the left hand side of the screens will be a series of menus which will lead you through the process.

[back to Table of Contents](#)

Submitting Plant Samples

As one famous plant pathologist once said, "An itty bitty sample plus itty bitty information equals an itty bitty diagnosis." For this reason, it is essential that you:

- 1) Completely fill out all the required forms for each sample submitted.
- 2) Submit a fresh plant sample showing symptoms representative of the problem.
- 3) Package the sample properly so it will arrive in the best possible condition.

Plant Disease Identification Forms

A separate Plant Disease Identification Form should be completed for each plant problem submitted. Do not list more than one plant type per form. Additional forms can be obtained from either laboratory, not from Agricultural Communications Services - Distribution.

In addition to this standard form, a supplementary Tree and Shrub Disease Identification Form must be completed for all tree and shrub problems. A copy of the form can be [downloaded from here](#). Please print this form on yellow paper.

Soil samples submitted for one of the soybean cyst nematode analyses must be accompanied by the Soybean Cyst Nematode Analysis Form and sent to the SCN Analysis Laboratory in Princeton. A copy of the form can be [downloaded from here](#).

Collecting and Packaging Samples

Detailed information on collecting samples is included in [PPA-9, Submitting Plant Specimens for Disease Diagnosis](#). Also see the video (there is a copy in each county office) entitled "*UK Plant and Insect Diagnostic/Identification Services*". A summary of specimen [packaging tips](#) is on pages 6-7 (this packet).

Notification of Diagnosis

The Plant Disease Identification Form consists of three parts. Once a diagnosis has been made and recorded on the form, the original copy (white) is mailed to the grower. The second copy (yellow) is sent to you [the Extension Agent for the grower's county], and the third copy (pink) is stored in the Laboratory's files.

At your request* or at our discretion, both the original (white) and second (yellow) copies of the form are sent directly to you. When this occurs, the Laboratory does not notify the grower of the laboratory results; rather, it is up to you to phone or mail the information to the grower.

*[Whenever you prefer to receive both the grower's copy and your own copy, draw a circle around your signature on the disease form.]

Turn-around time and delays in diagnosis.

Every effort is made to examine all specimens the day they are received or the following work day. In most cases, the diagnosis is made the same day the sample is examined. Should there be a delay in diagnosis because we are performing a special diagnostic test or consulting with another Specialist, Agents will be notified via E-mail.

Enclosures

Whenever possible, we accompany our reply with a [Fact Sheet PPFS](#), [PPA](#), a UK Extension publication, an issue of the [Kentucky Pest News](#), or other information relating to the disease or disorder. These are sent to the grower with his copy (white) and are generally not sent with your copy (yellow). For your information, these enclosures are cited in the diagnosis area on your copy. Below are the abbreviations used for the enclosures. A bulletin number or date will follow the abbreviation.

PPA	Plant Pathology Department Publication (UK Ag. Communications Ser.)
PPFS	Plant Pathology Fact Sheets (UK Plant Pathology Department)
AGR	Plant & Soil Sciences Department Publication (UK Ag. Communications Ser.)
ENT	Entomology Department Publication (UK Ag. Communications Ser.)
ENTFACT	Entomology Department Fact Sheets (UK Entomology Department)
HO	Horticulture Department Publication (UK Ag. Communications Ser.)
ID	Inter-department Publication (UK Ag. Communications Ser.)
KPN	Kentucky Pest News (UK Plant Pathology, Entomology, Plant & Soil Sciences Depts.)

[back to Table of Contents](#)

Tips for Packaging Plant Specimens

Our diagnosis depends entirely on the information provided and the sample submitted. It is up to you to screen the samples that are brought into your office and to occasionally reject those which you know are inadequate or in poor condition. Also, the proper packaging of samples for mailing is very important: It does not do any good to send an adequate, fresh specimen if it deteriorates en route!

The following tips are meant to give you guidelines for the kind of specimen that should be submitted and how it should be packaged to maintain its freshness as much as possible. We hope these suggestions will help you and, as a result, enable us to provide a better diagnostic service to your county! For more detailed instructions, see [PPA-9, Submitting Plant Specimens for Disease Diagnosis](#). Also see the video entitled "[UK Plant and Insect Diagnostic/Identification Services](#)" (there is a copy in each county office) .

Submit several plant specimens

Whenever possible, the grower should submit several whole plant samples, including the root systems. Generally, submitting only one or two leaves is unacceptable. Samples should show the various stages of disease development. (If possible, identify the samples depicting the various stages.) When the whole plant cannot be submitted, large portions of the plant(s) make the best samples. Branch specimens should be at least 12 inches long.

Fill in the Plant Disease Identification Form for all specimens

All the questions on the form should be filled in completely by the grower. This may require quizzing the grower to get all the necessary information. (Woody specimens must also be accompanied by a Tree and Shrub Disease Identification Form.)

Use plastic bags but not for all samples

Plant specimens often dry out en route; therefore, all samples should be enclosed in a plastic bag. (Exceptions: Fleshy fruits, vegetables, or tubers in the early stage of decay should be wrapped individually in newspaper. This also applies to mushrooms submitted for identification.)

Do not add water or use wet paper towels

Moisture hastens decay and the growth of saprophytic organisms, obscuring the real problem.

Tie off the root ball

Place the root system (with any accompanying soil) in a plastic bag and tie it securely to the lower stem of the plant. Place a second bag over the foliage portion of the plant in order to reduce desiccation.

Include identifying labels and diagnostic forms

Remember, these should never be packaged where they will come in contact with any soil or moisture.

Package delicate material in a sturdy box

Corrugated cardboard boxes or mailing tubes make the best mailers. Thin or flimsy boxes are easily damaged and are frequently smashed by the time we receive them. If you do use a non-corrugated box, please enclose it in a sturdier box for mailing. Padded envelopes are good for flat samples which are not likely to be easily crushed. Manila envelopes should only be used for flat specimens that are not likely to be damaged by the rough handling they will receive in the mail.

Mail all packages First Class

Mail early in the week

This will help to avoid delays that occur when the package is en route over the weekend.

NOTE:

For more detailed instructions, see [PPA-9](#), **Submitting Plant Specimens for Disease Diagnosis**.

Also see the video (there is a copy in each county office) entitled
[*"UK Plant and Insect Diagnostic/Identification Services"*](#)

[back to Table of Contents](#)

Soybean Cyst Nematode Samples

Cost

Charges for soybean cyst nematode (SCN) analyses are as follows:

Cyst Analysis/Egg Count - \$8.50 per sample.

Samples related to any research or demonstration projects being conducted by the county Ag. Extension agents are done free of charge. Contact the laboratory for additional information (see page 9 of this packet).

We must have at least 1 full pint of soil.

SCN Test for Nursery Trade Soils - \$8.50 if the sample does not contain cysts.
\$100.00 to determine if cysts are SCN by PCR.

This test is done to determine the presence or absence of SCN in fields from which balled and burlapped nursery stock is to be, or may in the future, shipped to states or countries not having SCN. The test results are helpful in making nursery planting decisions, or as an aid in meeting plant quarantine regulations. Also see publication [ID-110](#), "Soybean Cyst Nematode: A Potential Problem for Nurseries".

Samples for SCN Test for Nursery Soils must be accompanied by a separate form entitled "Soybean Cyst Nematode Analysis Form for the Nursery Trade". It is a small form, 5 1/2" by 8 1/2", available through the Soybean Cyst Nematode Analysis Laboratory at Princeton.

Plant/Root Examination for SCN

Please note that there is no charge for the routine examination of soybean roots to check for SCN infection.

Billing procedure

The nematode lab will send an itemized bill of services performed to your county for any of the above charges once a year. Your county office is responsible for the collection of these charges within your county. (The [Kentucky Soybean Board](#) may pay the \$8.50 fee at various times.)

Sampling

See the link in this sentence for a description of the [recommended procedure for sampling fields for SCN](#).

For Nursery Soils, see publication [ID-110](#), "Soybean Cyst Nematode: A Potential Problem for Nurseries".

Handling and mailing soil samples for SCN analysis

***Completely fill out the [Soybean Cyst Nematode Analysis Form](#) for an agronomic sample (e.g. soybeans in a field) or the "Soybean Cyst Nematode Analysis Form for the Nursery Trade", 5 1/2" by 8 1/2", available through the Soybean Cyst Nematode Analysis Laboratory at Princeton.**

Be sure to include all pertinent information requested on the form. If a sample or group of samples is to be charged to a research or demonstration project, please note that on the form(s).

***Contain samples in leak-proof plastic bags and place the bags in sturdy cardboard mailing boxes.**

***Properly identify the container holding each sample submitted.**

Never enclose identifying labels or analysis forms within the soil sampling box or bag!

Make sure the field name or sample number supplied on the nematode form matches the field name or sample number on the soil box or bag.

***Mail samples early in the week.**

All soybean cyst nematode samples should be mailed to the Soybean Cyst Nematode Analysis Laboratory at the following address:

Soybean Cyst Nematode Analysis Laboratory
UK Research and Education Center
1205 Hopkinsville Street
PO Box 469
Princeton KY 42445-0469

For additional information please contact Brenda Kennedy at the Soybean Cyst Nematode Analysis Laboratory, 270/365-7541 ext. 264.

Results

Results of cyst analyses will be recorded on the original form(s) provided by you. A copy of the results will be sent directly to the grower and to your office, providing a complete grower address is given. If you would prefer the results be sent only to your office, please indicate this on the form or leave off the grower's address.

[back to Table of Contents](#)

Walk-In Policy

Each year the Plant Disease Diagnostic Laboratory receives a number of non- Extension walk-ins (plant specimens from commercial growers, homeowners, consultants, and other clients that are not part of the Cooperative Extension Service). A majority of these clients expect (and usually have received) immediate attention to their plant problems. Increasing awareness of the Laboratory's services and its location has brought increasing numbers of these non-Extension walk-ins. This has created problems for the Diagnostician and Extension Specialists working in the Laboratory. First, it causes interruptions in work on specimens Extension personnel have mailed or brought to the Laboratory. Secondly, time is frequently used unwisely discussing the walk-in client's plant and other problems.

To increase Laboratory efficiency, we have formed a policy establishing the priorities by which samples will be handled.

Priorities for handling specimens

It is the primary purpose of the Plant Disease Diagnostic Laboratory to assist County Extension Agents and State Specialists in the diagnosis of plant disease problems. In keeping with this purpose, the following will be our priorities for handling specimens.

Priority Level	Sample Source
1	County Extension Agent and Extension Specialist walk-ins desiring an immediate reply.
2	Samples mailed in from County Extension Offices.
3	Samples hand-delivered from County Agents, but for which an immediate reply is not requested.
4	Samples mailed in directly from non-Extension clientele.
5	All other walk-ins - this includes commercial growers, homeowners, consultants, and professionals (e.g. lawn service, tree service, nursery workers, etc.)

Clients in the last category will be asked to complete the appropriate form(s) to be left with the sample(s). We then encourage these clients to contact their County Extension Agent regarding any future plant problems.

Samples left in the Diagnostic Laboratory unaccompanied by a completed diagnostic form(s) will not be processed.

We want to stress the following points:

1. **Extension Personnel: You will continue to receive top priority** for diagnostic services on the specimens you bring in or send through the mail.
2. **Agents: You will be notified of any walk-ins from your county.** The yellow copy of the completed diagnostic form for all such samples will be sent to you. We hope you will encourage clients via phone or mail to discuss future plant problems with you and to not go directly to the Diagnostic Laboratory.

When you bring specimens directly to the Laboratory, be sure to inform the Technician that you are an Extension Agent or Specialist, if you are not recognized as such. In addition, if a client contacts you about a plant problem and you subsequently advise them to hand-deliver the sample to our Laboratory, please have them tell us this at the time they deliver the sample.

If you have any questions about this policy, please contact an Extension Plant Pathologist or Diagnostician.

[back to Table of Contents](#)

"Where to Send What" Guide to UK Agricultural Diagnostic Services

To prevent unnecessary delays when specimens must be re-routed, please be sure to use the appropriate form and mail samples or inquiries directly to the correct Department or Laboratory.

Type of problem	Where to send it
Consultations on plant problems/identification.....	Digital Consulting System (DCS)
Insect injury suspected.....	Extension Entomologist
Insect identification	Department of Entomology
Insect control information	S-225 Ag. Science Center - North Univ. of KY; Lexington KY 40546-0091
Weed identification (DCS).....	Weed Control Specialist
Weed control information	Department of Plant & Soil Sciences
Herbicide injury suspected	Plant Sciences Building 1405 Veterans Drive Lexington, KY 40546-0312,
Test for triazines (herbicide) in soil (\$).....	Regulatory Services
Endophyte testing (under "Other tests and Fees" (\$)	103 Regulatory Services Bldg
Seed Germination Test (\$)	Univ. of KY; Lexington KY 40546-0275
Soil test for nutrients (\$).....	Reg. Services, Lexington (address above) or Regulatory Services Soil Testing Laboratory PO Box 469 or 1205 Hopkinsville Street Princeton KY 42445-0469
Test for nitrate levels in corn (\$).....	Breathitt Veterinary Center
Test for prussic acid levels in sorghum (\$)	Murray State University PO Box 2000/715 North Drive Hopkinsville KY 42241-2000 (270) 886-3959
Mycotoxin test (\$).....	See PPFS-MISC-1 for a list of recommended laboratories.
Hay/Forage Quality Testing (\$).....	KY Dept. Of Agriculture 1-800-248-4628
Plant disease problems on all crops	Plant Disease Diagnostic Laboratory
Mushroom identification	Agricultural Science Building - North Univ. of KY; Lexington KY 40546-0091 or PO Box 469 or 1205 Hopkinsville Street UK Research and Education Center Princeton KY 42445-0469
[All plant samples should be sent to the laboratory that has been designated for your county. All SCN analysis soil samples (\$) should be sent to the Princeton Laboratory, regardless of which laboratory serves your county.]	

(\$) - A fee is charged for these

[back to Table of Contents](#)

**Extension Plant Pathologists
 Diagnosticians / Technicians
 Administrators**

Personnel	Office phone	Area of specialty
Bernadette Amsden	859/257-7445 ext. 80723	Research Analyst
Paul Bachi	270/365-7541 ext. 228	Diagnostician, Princeton PDDL
Julie Beale	859/257-8949	Diagnostician, Lexington PDDL
Ed Dixon	859/257-7445 ext. 81290	Research Analyst
Brenda Kennedy	270/365-7541 ext. 264	Research Analyst, SCN Laboratory
Sara Long	859/257-8949	Diagnostic Aide, Lexington PDDL
Donald Hershman	270/365-7541 ext. 215	Soybeans; Small Grains; Canola
Kenny Seebold	859/257-7445 ext. 80721	Tobacco; Vegetables
David Smith	859/257-3901	Plant Pathology Department Chair; Extension Administration
Paul Vincelli	859/257-7445 ext. 80722	Forage Crops; Turfgrasses; Corn and Sorghum
Mindy Thompson	859/257-7445 ext. 81289	Extension Staff Assistant, Lexington

Mailing addresses:

Plant Disease Diagnostic Laboratories

Lexington

Plant Disease Diagnostic Laboratory
 Agricultural Science Building-North
 Lexington KY 40546-0091

Fax (859) 323-1961

Princeton

Plant Disease Diagnostic Laboratory
 PO Box 469 or 1205 Hopkinsville Street
 UK Research & Education Center
 Princeton KY 42445-0469

Fax (270) 365-2667

[back to Table of Contents](#)

Publications (PPA) and Fact Sheets (PPFS) from the Department of Plant Pathology

The following publications deal specifically with biotic and/or abiotic plant problems or contain plant disease information. Copies are available from the Ag Distribution Center (Bulletin Room), University of Kentucky, Lexington, KY 40546-0229.

Many of the publications are also available from the Extension Plant Pathology Web site at <http://www.ca.uky.edu/agcollege/plantpathology/extension/pubs.html>

The Plant Pathology Fact Sheets (PPFS) were developed by the diagnosticians and Extension specialists to provide pertinent information on plant disease/disorders. They include background information and specific disease control/ preventative measures. All of the Fact Sheets are available from the Extension Plant Pathology Web site at <http://www.ca.uky.edu/agcollege/plantpathology/extension/pubs.html>

Kentucky Pest News - This is a newsletter which provides timely information on anticipated and occurring diseases, insects, and pesticide information in Kentucky.

AGRONOMIC

Corn and Sorghum

Aflatoxin in Corn.	ID-59
Corn Stalk Rots.	PPA-26
Chemical Control of Weeds in Kentucky Farm Crops.	AGR-6
Diseases of Concern in Continuous Corn.	PPFS-AG-C-1
Ear Rot of Corn, Stenocarpella.	PPA-43
Grain Sorghum Diseases.	PPA-29
Grain Storage Rots.	KPN #1081
Fumonisin, Vomitoxin, and Other Mycotoxins in Corn Produced by Fusarium Fungi.	ID-121
Commercially Available Test Kits for the Detection of Mycotoxins in Corn and Other Grains.	PPFS-AG-C-3
Laboratories for Mycotoxin Analyses.	PPFS-MISC-1
Gray Leaf Spot of Corn.	PPA-35
Kentucky Integrated Crop Management Manual for Corn.	IPM-2
Kentucky Integrated Crop Management Manual for Sorghum.	IPM-5
Kentucky Plant Disease Management Guide for Corn and Sorghum.	PPA-10a
Seed and Seedling Diseases of Corn.	PPFS-AG-C-2
Stewart's Wilt of Corn.	PPA-33
Virus Diseases of Corn.	PPA-40

Forages

Kentucky Integrated Crop Management Manual for Alfalfa.	IPM-1
Kentucky Plant Disease Management Guide for Forage Legumes.	PPA-10d
Managing Diseases of Alfalfa.	ID-104
Emergency Inoculation for Poorly Inoculated Legumes.	PPFS-AG-F-4
Crown Rots of Alfalfa.	PPFS-AG-F-5
Alfalfa Diseases Caused by Rhizoctonia Fungi.	PPFS-AG-F-6
Risk Factors for Sclerotinia Crown and Stem Rot in Fall-Seeded Alfalfa.	PPFS-AG-F-2
Sampling for the Tall Fescue Endophyte in Pasture or Hay Stands.	PPA-30
Common Alfalfa Seedling Diseases and Disorders.	PPFS-AG-F-3
Summertime Foliar Diseases of Alfalfa.	PPFS-AG-F-1

Small Grains

Leaf Rust of Wheat.	PPA-25
Head Scab of Small Grains.	PPA-38
Wheat Fusarium Head Blight (Head Scab) in Relation to Tillage and Previous Crop.	PPFS-AG-SG-9
Kentucky Integrated Crop Management Manual for Small Grains.	IPM-4
Kentucky Plant Disease Management Guide for Small Grains.	PPA-10c
Septoria Diseases of Wheat.	PPA-39
Wheat Management - Disease.	ID-125 (Section 7)
Winter Decline Syndrome of Canola.	PPFS-AG-R-1
Take-All of Wheat.	PPFS-AG-SG-1
Wheat Bacterial Streak.	PPFS-AG-SG-2
Barley Yellow Dwarf.	PPFS-AG-SG-3
Wheat Spindle Streak Mosaic Virus (WSSM).	PPFS-AG-SG-4
Foliar Fungicide Use in Wheat.	PPFS-AG-SG-5
Wheat Foliar Fungicides: Past, Present, and Future.	PPFS-AG-SG-10
Preplant Decisions Greatly Impact Disease Potential in Wheat.	PPFS-AG-SG-6
Black "Sooty" Head Mold of Wheat.	PPFS-AG-SG-7
Wheat Streak Mosaic Virus (WSMV).	PPFS-AG-SG-8

Soybeans

Sampling Soybean Fields for SCN Analysis.	PPFS-AG-S-9
Kentucky Integrated Crop Management Manual for Soybean.	IPM-3
Kentucky Plant Disease Management Guide for Soybeans.	PPA-10b
Soybean Sudden Death Syndrome in Kentucky.	PPFS-AG-S-14
Brown Spot of Soybean.	PPFS-AG-S-1
Charcoal Rot of Soybean.	PPFS-AG-S-2
Downy Mildew of Soybean.	PPFS-AG-S-3
Phytophthora Root and Stem Rot of Soybean.	PPFS-AG-S-4
Root and Lower Stem Diseases of Soybean.	PPFS-AG-S-5
Southern Blight of Soybeans.	PPFS-AG-S-6
Stem Canker of Soybean.	PPFS-AG-S-7
Soybean Cyst Nematode.	PPA-42
2007 Soybean Cyst Nematode Management Recommendations for Kentucky.	PPFS-AG-S-24
Value of Wheat Residue in Soybean Cyst Nematode Management.	PPFS-AG-S-8
Sampling Soybean Fields for Soybean Cyst Nematode Analysis.	PPFS-AG-S-9
Use of Soybean Blends in Soybean Cyst Nematode Management programs.	PPFS-AG-S-10
Soybean Cyst Nematode "Races" soon to be a thing of the past.	PPFS-AG-S-20
Foliar Fungicide Use to Protect Soybean Seed Quality.	PPFS-AG-S-11
Seed Treatment Fungicides for Soybeans.	PPFS-AG-S-12
Soybean Diseases Control Series: <i>Are We Missing Opportunities?</i> (Parts 1 - 6) PART 1: Soybean Cyst Nematode.	PPFS-AG-S-13
PART 2: Soybean Sudden Death Syndrome.	PPFS-AG-S-14
PART 3: Root and Lower Stem Diseases.	PPFS-AG-S-15
PART 4: Foliar Diseases Caused by Bacteria and Fungi.	PPFS-AG-S-16
PART 5: Virus Diseases of Soybean.	PPFS-AG-S-17
PART 6: Fungal Pod and Stem Diseases of Soybean.	PPFS-AG-S-18
Soybean Foliar Spots and Blights.	PPFS-AG-S-19
Australasian Soybean Rust: An Exotic Pest Threat.	PPFS-AG-S-21
2005 Soybean Rust Fungicide Use Guidelines.	PPFS-AG-S-23

Soybean: Early Planting and Disease..... [PPFS-AG-S-22](#)

Tobacco

Black Root Rot. [AGR-35](#)
[Blue Mold Warning System](#)
Burley Tobacco Virus Complex. PPA-22
A Guide to Burley Tobacco Varieties. UK/UT Tobacco Task Force
Dealing With Chemical Injury in Tobacco. [AGR-158](#)
Management of Tobacco Float Systems. [ID-132](#)
Managing Acid Soils for Production of Burley Tobacco. [AGR-109](#)
Manganese Toxicity. [AGR-22](#)
Tobacco Production Guide. [ID-160](#)
Fungicide Guide for Burley and Dark Tobacco. [PPFS-AG-T-8](#)

FRUIT

General

Commercial Small Fruit Spray Guide. [ID-94](#)
Commercial Tree Fruit Spray Guide. [ID-92](#)
Disease and Insect Control for Home Fruit. [ID-21](#)
2007 Fruit and Vegetable Crops Research Report. [PR-555](#)
Growing Fruit at Home in Kentucky. HO-64
Kentucky Backyard Apple Integrated Pest Management Manual. [IPM-9](#)
Midwest Tree Fruit Handbook. [ID-93](#)
Tissue Analysis, Fruit Crop. [HORTFACT-3001](#)

Small Fruits

Highbush Blueberries. [HO-60](#)
Anthracnose of Bramble Fruits. [PPA-32](#)
Blackberry Rosette (Double Blossom). [PPFS-FR-S-3](#)
Orange Rust of Brambles. [PPFS-FR-S-6](#)
Raspberry Fruit Rots. [PPFS-FR-S-4](#)
Growing Blackberries and Raspberries in Kentucky. [HO-15](#)
Black Rot of Grape. [PPA-27](#)
Cane and Leaf Spot ("Dead Arm") of Grape. [PPFS-FR-S-1](#)
Growing Grapes in Kentucky. [ID-126](#)
Grape Cultivar Trial. [see here](#)
Grape Crown Gall. [PPFS-FR-S-11](#)
Gray Mold of Strawberry. [PPA-31](#)
Strawberry Production. [HO-16](#)
Black Root Rot of Strawberry. [PPFS-FR-S-2](#)
Strawberry Anthracnose. [PPFS-FR-S-5](#)

Tree Fruits

Apple Cultivar Study. [see here](#)
Apple Scab. [PPA-24](#)
Apple Fruit Diseases Appearing at Harvest. [PPFS-FR-T-2](#)
Frogeye Leaf Spot, Black Rot, and Canker of Apple. [PPFS-FR-T-3](#)
Fire Blight. [PPA-34](#)

Using MARYBLYT Program to Aid in Apple Fire Blight Control.	PPFS-FR-T-7
Growing Peaches in Kentucky.	HO-57
Nut Tree Production in Kentucky.	ID-77
Peach Cultivar Trial.	see here
Rootstocks for Kentucky Fruit Trees.	HO-82
Rust Diseases of Apple.	PPA-23
Peach Leaf Curl and Plum Pockets.	PPFS-FR-T-1
Peach Fruit Diseases.	PPFS-FR-T-9
Black Knot.	PPFS-FR-T-4
Cherry Leaf Spot.	PPFS-FR-T-6
Gummosis and Perennial Canker of Stone Fruits.	PPFS-FR-T-8

ORNAMENTALS

Herbaceous Ornamentals and Houseplants

2007 Nursery and Landscape Research Report.	PR-554
2007 Garden Flower Trials: Results of Annual Flower Evaluations by Kentucky Master Gardeners	PR-554
Guide for Control of Annual and Perennial Flower and Ground Cover Diseases in the Landscape.	ID-87
Iris Diseases.	PPFS-OR-H-7
Phlox Powdery Mildew.	PPFS-OR-H-8
Diseases of Landscape Ground Cover Plants.	PPFS-OR-H-6
Diseases & Cultural Problems of Houseplants.	PPFS-OR-H-4
Houseplant Insect Control.	ENTFACT 406
Cultivating Ginseng in Kentucky.	ID-60
Bacterial Blight of Geranium.	PPFS-OR-H-1
Preventing Greenhouse Poinsettia Diseases.	PPFS-OR-H-2
Controlling Phytophthora Root Rot in Greenhouse Ornamentals.	PPFS-OR-H-9
Foliar Nematodes of Ornamental Plants.	PPFS-OR-H-3
Oedema.	PPFS-OR-H-5
Slime Mold, Lichens, & Sooty Mold Problems on Plants.	PPFS-MISC-3

Turfgrass

Brown Patch Disease.	ID-112
Chemical Control of Turfgrass Diseases.	PPA-1
Disease Management in the Home Lawn.	ID-105
Destructive Diseases Common on Turfgrasses in Kentucky.	PPFS-OR-T-9
Lawn Establishment in Kentucky.	AGR-50
Lawn Fertilization in Kentucky.	AGR-53
Improving Turf Through Renovation.	AGR-51
Managing Spring Dead Spot of Bermudagrass.	ID-130
Mowing, Dethatching, Coring and Rolling Kentucky Lawns.	AGR-54
Patch Diseases in Kentucky Bluegrass Lawns.	ID-122
Selecting the Right Grass for your Kentucky Lawn.	AGR-52
Weather Favorable for Cottony Blight in Turfgrasses.	PPFS-OR-T-1
Avoid Resistance to Fungicides Used to Control Diseases of Turfgrasses.	PPFS-OR-T-2
Efficacy of Fungicides for Controlling Gray Leaf Spot of Perennial Ryegrass.	PPFS-OR-T-3
Localized Dry Spot.	PPFS-OR-T-5
Pythium Root Rot of Turfgrasses.	PPFS-OR-T-6

Does Fungicide Usage Increase Thatch Accumulation in Turf?	PPFS-OR-T-8
Sudden Deterioration of New Creeping Bentgrass Putting Greens.	PPFS-OR-T-10
Slime Mold, Lichens, & Sooty Mold Problems on Plants.	PPFS-MISC-3

Woody Ornamentals

2007 Nursery and Landscape Research Report.	PR-554
Anthracnose Diseases of Shade Trees.	PPA-17
Flowering Crabapple.	ID-68
Flowering Dogwood.	ID-67
How Dry Seasons Affect Landscape Plants.	ID-89
Iron Deficiency of Landscape Plants.	ID-84
Leaf Scorch and Winter Drying on Woody Ornamentals.	ID-51
Needle Cast Diseases of Conifers.	ID-85
Principles of Home Landscape Fertilization.	ID-72
Roses and Their Care.	ID-118
Shade Tree Decline and Related Problems.	ID-50
Soybean Cyst Nematode Analysis Form for the Nursery Trade.	ID-110
Transplanting Trees and Shrubs.	ID-80
Twig, Branch and Stem Diseases of Pine.	PPA-16
Verticillium Wilt of Woody Ornamentals.	PPA-18
Warning: Topping is Hazardous to Your Tree's Health.	ID-55
Woody Plant Disease Control Guide for Kentucky.	ID-88
Woody Plants under Stress.	ID-71
Wounds and Wood Decay of Trees.	PPFS-OR-W-1
Dutch Elm Disease.	PPFS-OR-W-2
Black Root Rot of Ornamentals.	PPFS-OR-W-3
Wet Feet in the Landscape.	PPFS-OR-W-4
Shoestring Root Rot - A Cause of Tree and Shrub Decline.	PPFS-OR-W-5
Dogwood Anthracnose.	PPFS-OR-W-6
Maintaining Healthy Rhododendrons and Azaleas.	PPFS-OR-W-7
Understanding and Controlling Diseases of Landscape Plants.	PPFS-OR-W-8
Pyracantha Scab.	PPFS-OR-W-9
Black Spot of Rose.	PPFS-OR-W-10
Twig Blights of Juniper.	PPFS-OR-W-11
Bacterial Leaf Scorch.	PPFS-OR-W-12
Dogwood Powdery Mildew.	PPFS-OR-W-13
Slime Mold, Lichens, & Sooty Mold Problems on Plants.	PPFS-MISC-3

VEGETABLES

Bean Diseases.	PPA-13
Commercial Vegetable Crop Recommendations.	ID-36
2007 Fruit and Vegetable Crops Research Report.	PR-555
An IPM Scouting Guide for Common Pests of Solanaceous Crops in KY.	ID-172
Management Tips for Disease Control in Commercial Vegetables in Kentucky.	PPFS-VG-5
Disease Control in Commercial Vegetable Plant Beds.	PPFS-VG-6
Seed Treatments for Commercial Vegetables in Kentucky.	PPFS-VG-9
Cucurbit Diseases.	ID-91
Home Vegetable Gardening in Kentucky.	ID-128
Vegetable Cultivars for Kentucky Gardens.	ID-133
Kentucky Sweet Corn Insect Integrated Pest Management Manual.	IPM-10

Integrated Crop Management for Kentucky Cabbage.	IPM-11
Kentucky Pumpkin Integrated Pest Management Manual.	IPM-12
Kentucky Pepper Integrated Pest Management Manual.	IPM-13
Stewart’s Wilt of Corn.	PPA-33
Black Rot of Crucifers.	PPFS-VG-1
Blossom End Rot.	PPFS-VG-2
Southern Blight.	PPFS-VG-3
Bacterial Spot of Pepper and Tomato.	PPA-15
Blackleg Disease of Potatoes.	PPA-14
Tomato Wilt Problems.	PPA-19

GENERAL

Fundamental Principles of Plant Pathology for Agricultural Producers.	PPA-41
Submitting Plant Specimens for Disease Diagnosis.	PPA-9
Understanding Pesticide Labels and Labeling.	ID-100
Root Knot Nematode.	PPA-20
Crown Gall.	PPFS-GEN-1
Powdery Mildew.	PPFS-GEN-2

GREENHOUSE

Managing the Greenhouse Environment to Control Plant Diseases.	PPFS-GH-1
Control of Tomato Spotted Wilt Virus and Impatiens Necrotic Ring Spot Virus and their Vectors, Western Flower Thrips, in Greenhouse Crops.	PPFS-GH-2

MISCELLANEOUS

Laboratories for Mycotoxin Analyses.	PPFS-MISC-1
Systemic Fungicide Resistance - A Threat to Kentucky Agriculture.	PPFS-MISC-2
Slime Mold, Lichens, & Sooty Mold Problems on Plants.	PPFS-MISC-3
Diseased Risk Posed by Peanuts on Organic Farms.	PPFS-MISC-4

[back to Table of Contents](#)

**American Phytopathological Society (APS)
Compendia of Plant Diseases**

The following compendia are available from the American Phytopathological Society,
3340 Pilot Knob Road, St. Paul MN 55121-2097. Toll Free (800) 328-7560.
FAX Number (651) 454-0766. Price: \$55.00 to \$59.00 each. <http://www.shopapspress.org>

Compendium of Alfalfa Diseases, 2nd edition.....	1990	104 pp.
Compendium of Apple and Pear Diseases.	1990	100 pp.
Compendium of Barley Diseases, 2nd edition.	1997	120 pp.
Compendium of Bean Diseases, 2nd edition.	2005	120 pp.
Compendium of Beet Diseases and Insects.....	1986	107 pp.
Compendium of Blueberry and Cranberry Diseases.	1995	120 pp.
Compendium of Brassica Diseases.	2007	136 pp.
Compendium of Chrysanthemum Diseases.	1997	88 pp.
Compendium of Citrus Diseases, 2nd edition.	2000	128pp.
Compendium of Conifer Diseases.	1997	128 pp.
Compendium of Corn Diseases, 3rd edition.	1999	128 pp.
Compendium of Cotton Diseases, 2nd edition.	2001	104 pp.
Compendium of Cucurbit Diseases.	1996	87 pp.
Compendium of Flowering Potted Plants.	1995	90 pp.
Compendium of Grape Diseases.	1988	121 pp.
Compendium of Lettuce Diseases.	1997	104 pp.
Compendium of Nut Crop Diseases in Temperate Zones.	2001	123 pp.
Compendium of Onion and Garlic Diseases, 2nd edition.	2008	? pp.
Compendium of Ornamental Foliage Plant Diseases.	1987	100 pp.
Compendium of Ornamental Palm Diseases and Disorders.	2004	71 pp.
Compendium of Pea Diseases and Pests, 2nd edition.	2001	90 pp.
Compendium of Peanut Diseases, 2nd edition.	1997	94 pp.
Compendium of Pepper Diseases.	2003	88 pp.
Compendium of Potato Diseases, 2nd edition.....	2001	142 pp.
Compendium of Raspberry and Blackberry Diseases and Insects.....	1991	122 pp.
Compendium of Rhododendron and Azalea Diseases.	1986	77 pp.
Compendium of Rice Diseases.	1992	138 pp.
Compendium of Rose Diseases, 2nd edition.....	2007	96 pp.
Compendium of Sorghum Diseases, 2nd edition.	2000	129 pp.
Compendium of Soybean Diseases, 4th edition	1999	124 pp.
Compendium of Stone Fruit Diseases.	1995	122 pp.
Compendium of Strawberry Diseases, 2nd edition	1998	128 pp.
Compendium of Sweet Potato Diseases.	1988	75 pp.
Compendium of Tobacco Diseases.	1991	90 pp.
Compendium of Tomato Diseases.	1991	100 pp.
Compendium of Tropical Fruit Diseases.	1994	118 pp.
Compendium of Turfgrass Diseases, 3rd edition.....	2005	160 pp.
Compendium of Umbelliferous Crops.	2002	102 pp.
Compendium of Wheat Diseases, 2nd edition.	1987	124 pp.

[back to Table of Contents](#)

HERBACEOUS ORNAMENTAL REFERENCES

Paul R. Bachi and Winston C. Dunwell
Plant Diagnostician and Extension Horticulture Specialist
University of Kentucky, Research and Education Center Princeton, Ky

December 2008

This information can also be found at:

<http://www.ca.uky.edu/agcollege/plantpathology/PPAExten/herborns.htm>http://www.ca.uky.edu/agcollege/plantpathology/extension/county_support.html#Herbaceous

or via Getting Started in the Nursery/Landscape Business under Dr. Dunwell's Homepage

<http://www.ca.uky.edu/HLA/Dunwell/win1.html>

Manual of Herbaceous Ornamental Plants. 1994. S.M. Still. Stipes Publishing Co. 814 pp. Hardcover \$54.95 Paperback \$39.95.

Ball Perennial Manual. 1996. Nau, J. Ball Publishing, Batavia, IL. 512 pp. \$64.95.

Ball Redbook, Volumes I & II 2003. Ball, V. (ed.) Ball Publishing, Batavia, IL. 850 pp. \$100.00.

Herbaceous Perennial Plants, 3rd edition. 2008. A.M. Armitage. Stipes Publishing Co. 1224 pp. \$68.80 (paperback) \$84.80 (hardcover).

Armitage's Garden Annuals. 2004. Allan Armitage. Timber Press, 268 pp. \$49.95 (hardcover).

Armitage's Garden Perennials. 2000. Allan Armitage. Timber Press, 324 pp. \$49.95 (hardcover).

Armitage's Manual of Annuals, Biennials and Half-hardy Perennials. 2001. Allan Armitage. Timber Press, 604 pp. \$39.95 (hardcover).

Diseases of Annuals and Perennials. 1995. Chase A.R., M. Daughtrey, and G. Simone. Ball Publishing, Batavia, IL 208 pp. \$59.95.

The American Horticultural Society Pests and Diseases. 2000. P. Greenwood, A. Halstead, A.R. Chase and D. Gilrein. DK Publishing, 218 pp. \$34.95 (hardcover).
(Note: Becoming scarce.)

Ball Field Guide to Diseases of Greenhouse Ornamentals. 1992. Daughtrey, M. and A.R. Chase. Ball Publishing, Batavia, IL. 218 pp. \$66.95.

The Ortho Problem Solver, 6th edition. 2003. Smith, M. (ed.) The Scotts Company, Maryville, OH 1024 pp. \$149.95 (hardcover). (Note: Becoming scarce.)

Common Poisonous Plants and Mushrooms of North America. 1991. Turner, Nancy J. and Adam A. Szczawinski. Timber Press, Inc. Portland, OR 1-800-327-5680 324 pp. \$24.95 (paperback). (New edition will be available May 15, 2009.)

***Foliage Plant Diseases Diagnosis and Control.** 1997. A.R. Chase. American Phytopathological Society. 168 pp. \$79.00 Available: see APS Press address below under Disease Compendia.

***Managing Diseases in Greenhouse Crops**. 1992. W.R.. Jarvis. American Phytopathological Society. 288 pp. \$89.00 English or Spanish. Available: see APS Press address below under Disease Compendia.

***Disease Compendia** - available from the [American Phytopathological Society Press](http://www.americanphytopathologicalsociety.org/), 3340 Pilot Knob Road, St. Paul MN 55121 1-800-328-7560 \$55.00 to \$59.00 each.

* **Chrysanthemum Diseases**, 1997

* **Flowering Potted Plant Diseases**, 1995

* **Ornamental Foliage Plant Diseases**, 1987

Note: Many of the above references are available in the catalog "Horticultural books, videos and software" by

American Nurseryman Publishing Company

Book Department

77 W. Washington St., Suite 2100

Chicago, IL 60602-2904

Phone: 1-800-621-5727

<http://www.amerinnursery.com/tabid/121/default.aspx>

e-mail: books@amerinnursery.com

[back to Table of Contents](#)

NURSERY AND ARBORIST REFERENCES

Paul R. Bachi and Winston C. Dunwell
Plant Diagnostician and Extension Horticulture Specialist
University of Kentucky, Research and Education Center Princeton, Ky 42445

December 2008

This information can also be found at:

http://www.ca.uky.edu/agcollege/plantpathology/extension/county_support.html#Woody
or via Getting Started in the Nursery/Landscape Business under Dr. Dunwell's Homepage
<http://www.ca.uky.edu/HLA/Dunwell/win1.html>

American Standard for Nursery Stock. 2004. American Association of Nurserymen. 113 pp. \$74.95 (3-ring binder). Online at
<http://www.anla.org/applications/Documents/Docs/ANLAStandard2004.pdf>

The Reference Manual of Woody Plant Propagation, 2nd Edition. 2006. Dirr, M.A. and C.W. Heuser, Jr. Varsity Press, Inc. Athens, GA 30604 239 pp. \$37.95.

Best Management Practices: Guide for Producing Nursery Crops, 2nd Edition. 2007
Southern Nursery Association. 103 pp. Purchase from the Kentucky Nursery and Landscape Association
Betsie A. Taylor, KNLA Exec. Dir., 216 Pendleton Lane, Frankfort, Ky. 40601, Frankfort, KY 40601;
502.848.0055, 800.735.9791; Fax, 502.848.0013; e-mail, KNLA@mis.net; url, <http://www.knla.org/>

IPM Calendar for Deciduous Tree Production, 2008. Fulcher, Amy.
<http://www.ca.uky.edu/HLA/Dunwell/ipmcalendar2008.pdf>

Arboriculture: Integrated management of Landscape Trees, Shrubs, and Vines. 4th edition 2003.
Harris, R. Prentice-Hall, Inc., Englewood Cliffs, NJ 07632 687 pp. \$76.80 (paperback)

Manual of Woody Landscape Plants: Their Identification, Ornamental Characteristics, Culture, Propagation, and Uses. 5th edition. 1998. Dirr, M.A. Stipes Publishing Co., Champaign-Urbana, IL 826 pp. \$52.80 (paperback).

Principles and Practices of Planting Trees and Shrubs. 1997. International Society of Arboriculture, Savoy, IL 200pp. \$49.95.

* **Scouting and Controlling Woody Ornamental Diseases in Landscapes and Nurseries.** 1992. Moorman, G.W. Penn State University. Available from: Publication Distribution Center, Penn State Univ., University Park, PA 16802-260290 pp. \$7.00.

* **Diseases of Woody Ornamental Plants and Their Control in Nurseries.** Jones, R.K. and D. M. Benson (eds.) 2001. Available from: [American Phytopathological Society Press](http://www.americanphytopathologicalsociety.org/), 3340 Pilot Knob Road, St. Paul MN 55121 1-800-328-7560. 350 pp. \$89.00.

Pirone's Tree Maintenance. 7th edition, 2000. Hartman, J.R., T.P. Pirone, and M.A. Sall. Oxford University Press. 514 pp. \$52.00.

Diseases of Trees and Shrubs, 2nd edition. 2005. Sinclair, W.A., H.H. Lyon, and W.T. Johnson. Comstock Publishing Assoc., Cornell Univ. Press, Ithaca, NY 574 pp. \$68.00.

Insects That Feed on Trees and Shrubs, 2nd edition. 1991. Johnson, W.T. and H.H. Lyon. Comstock Publishing Assoc., Cornell University, Ithaca, NY 556 pp. \$63.96.

The Ortho Problem Solver, 6th edition. 2003. Smith, M. (ed.) The Scotts Company, Maryville, OH 1024 pp. \$149.95 (hardcover). (Note: Becoming scarce.)

The American Horticultural Society Pests and Diseases. 2000. P. Greenwood, A. Halstead, A.R. Chase and D. Gilrein. DK Publishing, 218 pp. \$34.95 (hardcover). (Note: Becoming scarce.)

Ball Field Guide to Diseases of Greenhouse Ornamentals. 1992. Daughtrey, M. and A.R. Chase. Ball Publishing, Batavia, IL. 218 pp. \$66.95.

***Disease Compendia** - available from [American Phytopathological Society Press](http://www.americanphytopathologicalsociety.org/), 3340 Pilot Knob Road, St. Paul MN 55121 1-800-328-7560 \$55.00 to \$59.00 each.

* **Conifer Diseases**, 1997

* **Turfgrass Diseases**, 3rd edition, 2005

* **Rose Diseases**, 2007

* **Rhododendron and Azalea Diseases**, 1986

Note: Many of the above references are available in the catalog "Horticultural books, videos and software" by

American Nurseryman Publishing Company

Book Department

77 W. Washington St., Suite 2100

Chicago, IL 60602-2904

Phone: 1-800-621-5727

<http://www.amerinnursery.com/tabid/121/default.aspx>

e-mail: books@amerinnursery.com

[back to Table of Contents](#)

FRUIT REFERENCES

Paul R. Bachi and Joseph G. Masabni
Plant Diagnostician and Extension Horticulture Specialist
University of Kentucky, Research and Education Center Princeton, Ky

December 2008

Modern Fruit Science, 10th edition. 1995. Childers, Norman F., J. Morris, and G. Sibbett. Horticultural Publications, 3906 NW 31 Place, Gainesville, FL 32606. 632 pp. \$29.50 plus \$6.00 postage and handling. (Note: Becoming scarce.)

Temperate Zone Pomology. 1993. Westwood, Melvin N. Timber Press, Inc. Portland, OR 428 1-800-327-5680 536 pp. \$65.00 (Note: Becoming scarce.)

Small Fruit Crop Management. 1990. Galletta, Gene J. and D. Himelrick. Prentice-Hall, Inc. 602 pp. \$125.00

Integrated Pest Management for Apples and Pears, 2nd edition, 1999. Regents of the University of California., Publication 3332 1-800-994-8849, Fax 510-643-5470. 232 pp. \$30.00

Peaches, Plums and Nectarines: Growing & Handling for the Fresh Market. 1989. J. H. LaRue and R. S. Johnson 246 pp. \$45.00 (paperback).

The Backyard Orchardist. 1994. Stella Otto. Chelsea Green Publishing. 250 pp. \$15.95.

The Berry Grower's Companion. 2000. Barbara L. Bowling. Timber Press, 9999 SW. Wilshire, Portland, OR 97225 308 pages \$19.95.

Grape Growing. 1976. Robert J. Weaver. John Wiley & Sons. 371 pp. \$120. Used \$65 up.

Tree Fruit Insects. 1993. Angus J. Howitt. Tree Fruit Insects. Cooperative Extension Service. Michigan State University. North Central Regional Extension Publication No. 63. 252 pp.

Diseases of Tree Fruits in the East. 1996. Jones, A.L. and T.B. Sutton. Cooperative Extension Service. Michigan State University. North Central Regional Extension Publication No. 45. 95 pp.

Pests of the Garden and Small Farm. 1999. Mary L. Flint. University of California Press, Toll-Free: 1-800-UC-BOOKS or 1-800-777-4726 286 pp. \$21.95.

***Disease Compendia** - available from the [American Phytopathological Society Press](#), 3340 Pilot Knob Road, St. Paul MN 55121 1.800.328.7560 \$55.00 to \$59.00 each.

* **Apple and Pear Diseases**, 1990

* **Blueberry and Cranberry Diseases**, 1995

* **Grape Diseases**, 1988

* **Raspberry and Blackberry Diseases and Insects**, 1991

* **Strawberry Diseases**, 2nd edition, 1998

* **Stone Fruit Diseases**, 1995

[back to Table of Contents](#)

VEGETABLE REFERENCES

Brent Rowell and Paul R. Bachi
Extension Horticulture Specialist (former) and Plant Diagnostician
University of Kentucky

December 2006

What becomes immediately apparent is there are very few good and up-to-date texts on commercial vegetable production. The most information for your money will be Knott's Handbook (see below). The Specialty and Minor Crops Handbook (see below) from California is also highly recommended. Much more up-to-date information is now found on the web and the reference pages from the "Vegetable Production and Marketing Information Online: Selected Links for Commercial Growers" should be your guide <http://www.uky.edu/Agriculture/Horticulture/veglinks.htm>

Knott's Handbook for Vegetable Growers, 5th edition. 2006. Maynard, D.N., and G.J. Hochmuth. John Wiley & Sons. 640 pp. Available from the publisher, www.Wiley.com, for \$75 possibly cheaper from other online book companies.

Starting and Strengthening Farmers' Markets in Pennsylvania, 2nd edition. 2002. Center for Rural Pennsylvania. 200 North Third St., Suite 600, Harrisburg, PA 17101 phone (717) 787-9555
Online at <http://www.ruralpa.org/FarmMkt.pdf>

Specialty and Minor Crops Handbook (Pub. 3346). 1998. Univ. of California. 63 crops plus bibliography on 220 crops. \$35.00 + S&H 1-800-994-8849, Fax 510-643-5470

Rodale's Illustrated Encyclopedia of Organic Gardening. 2005. Anna Kruger. 416 pp. \$25.00.

The Vegetable Gardener's Bible. 2000. Edward C. Smith. 309 pp. \$24.95

The New Organic Grower. 1995. Coleman, E. Chelsea Green Publishing Co. 352 pp. \$24.95

Vegetable Diseases. 2007. Koike, Steven T., P. Gladders, and A.O. Paulus, Academic Press. 448 pp. \$165.00 (limited time, usually \$170.00) <http://www.shopapspress.org/vedicoha.html>

Identifying Diseases of Vegetables (AGRS -21). 1994. The Pennsylvania State University. Available from: Publication Distribution Center, Penn State Univ., University Park, PA 16802-2602 \$13.00. Phone 814-865-6713. Fax 814-863-5560. <http://pubs.cas.psu.edu/PubAll.asp?varA2z=I>

Diseases and Pests of Vegetable Crops in Canada. 1994. Howard, Ronald J., J.A. Garland, and W.L. Seaman. The Canadian Phytopathological Society and the Entomological Society of Canada. 554 pp. \$58.00 Available in bookstores or directly from Entomological Society of Canada
<http://esc-sec.org/disease.htm>.

Vegetable Insect Management, 2nd edition. 2005. MeisterPro Information Resources. 37733 Euclid Ave. Willoughby, OH 44094-5992. This is an excellent guide to insect pest management and control with emphasis on the midwest (including Kentucky). \$79 from the publisher www.MeisterPro.com.

Pests of the Garden and Small Farm. 1999. M.L. Flint. Regents of the University of California. Statewide Integrated Pest Management Project, University of California, Division of Agriculture and Natural Resources <http://www.ucpress.edu/books/pages/2913.html> 286 pp. \$21.95 1-800-994-8849, Fax 510-643-5470

***Disease Compendia** - available from the [American Phytopathological Society Press](http://www.americanphytopathologicalsociety.org/), 3340 Pilot Knob Road, St. Paul MN 55121 1-800-328-7560 \$55.00 to \$59.00 each.

***Bean Diseases**, 2nd edition, 2005

***Beet Diseases and Insects**, 1986

***Brassica Diseases**, 2007

***Corn Diseases**, 3rd edition, 1999

***Cucurbit Diseases**, 1996

***Lettuce Diseases**, 1997

***Onion and Garlic Diseases**, 2nd edition, 2008

***Pea Diseases and Pests**, 2nd edition, 2001

***Pepper Diseases**, 2003

***Potato Disease**, 2nd edition, 2001

***Sweet Potato Diseases**, 1988

***Tomato Diseases**, 1991

***Umbelliferous Crop Diseases**, 2002

[back to Table of Contents](#)

Training Opportunities, Videotapes, and DVDs

Secretarial Training

This training program is geared toward County Extension Secretaries; however, Agents would also benefit from attending. Sessions are conducted on an area-wide basis during the fall to spring period, upon request. The Diagnosticians lead the sessions, discussing the specifics of the various Plant Disease Diagnostic forms, packaging specimens, interviewing growers, and what constitutes a good specimen. For more information, contact either Julie Beale (859/257-8949) or Paul Bachi (270/365-7541 ext. 228). Also see the [County Extension Office Procedure Manual - Plant Pathology](#).

Agent Training

Plant Pathology Specialists provide training in plant pathology for County Agents by area or multiple areas. Sometimes training is oriented towards new Agents, while other times it is more advanced. Check with your Area Program Director for specific training times. Also see [County Agent Training & Support](#) webpage.

Digital Consulting System

The [Digital Consulting System](#) is a web based program to submit a question about plant problems or pest identification to a member of the University of Kentucky. After you login (via CATPAWS login id and password) on the left hand side of the screens will be a series of menus which will lead you through the process.

PowerPoint® Presentations - Master Gardeners -

See the [Internal Software Downloads webpage](#) to download the presentations for County use.

Videotapes and DVDs

[UK Plant and Insect Diagnostic/Identification Services](#) - there is a copy in each county and with the Area Program Directors.

For other titles contact Carrie Howard, (859/257-7233) Ag. Communications Services, for a loaner copy. Check the Order Entry system for a recent list.

Plant Pathology Titles	Code
4-H Forest Pathology	VPP-0689
Agent Training: Tobacco Series - Parts 1-4	VPP-0725
Agent Training: Tobacco Series - Part 5	VPP-0726
Bacterial Disease Workshop	DPP-0003
Biotechnology: Challenges for Extension	VPP-0194
Blue Mold Conference Proceedings	VPP-1039
Dogwood Anthracnose	VPP-0223
Fruit Diseases	DPP-0059
Plant Virus Training	DPP-0023
Soybean Cyst Nematode Management	VPP-0723

[back to Table of Contents](#)

Plant Pathology Terms

Have you ever been confused by the terms used by your friendly, local Plant Disease Specialist? Or are some of the terms used on the Plant Disease Identification Form confusing to you? As with other professionals, Plant Pathologists have a language of their own. The following definitions should help clarify some of the commonly used plant pathology jargon.

Symptoms

Blight: Sudden death of foliage, blossoms or twigs suddenly killed by a pathogenic organism (e.g. fire blight of apple).

Callus: An overgrowth of host tissue formed in response to wounding or disease. The plant produces callus around the injured site in an attempt to close a wound.

Canker: A diseased, sunken, dead area in woody root, stem or branch tissues.

Chlorotic/chlorosis: Yellowing; a partial or complete lack of green color.

Dieback: The death of a shoot from the tip back towards the main stem.

Distortion: Applied to plant tissues which are abnormally curled, puckered or otherwise misshapen.

Gall/swelling: A localized outgrowth (bump, protrusion).

Gummosis: An abnormal discharge of gum or resin from injured plant tissue.

Leaf scorch: Browning of leaf tissue along the leaf margins and/or between the veins.

Mosaic: Pattern of random patches of green and light green or yellow tissues on leaves or fruit.

Mottling: An irregular pattern of indistinct light and dark areas.

Mummy: A fleshy plant part (such as the fruit) which has lost its moisture, dried up, and become hard and wrinkled.

Necrosis/necrotic: Dead; the tissue usually appears brown to black.

Rot/decay: Disintegration of plant tissue; frequently results in a brown, black or water-soaked appearance of the tissue. Includes: root rot, stem rot, fruit decay or rot, crown rot, and soft rot.

Shot-hole: Approximately circular holes left in leaves when the center of a leaf spot has dropped out.

Spotting: Distinct, localized spots which may appear on leaves, fruit or other plant parts.

Stunting: An abnormal reduction in plant height compared to healthy plants of the same age.

Vascular discoloration: A browning of the water-conducting tissues of a plant. A cut into the stem, root or tuber must be made to observe this.

Wilt: Loss of rigidity and drooping of plant parts resulting from insufficient water in the plant.

Witch's broom: An abnormal brush-like development of many weak shoots or branches.

Distribution of diseased plants

Entire planting: The problem is distributed throughout the entire planting.

Every plant: Every single plant (100% of crop, or very nearly so) in the field, garden or landscape is showing identical symptoms.

Group of plants: A discrete group of plants or a patch of plants is showing the same symptoms. All plants within the group are affected, while plants just outside this area are unaffected. More than one such group may be present in the field, garden or landscape.

Large area: A sizable portion of a field, garden or landscape is affected by the same problem.

Part of plant: Only a portion of the plant is affected.

Scattered plants: Single plants are affected and scattered throughout the planting among apparently healthy plants. Although these affected plants may be present over the entire field, this is not the same as "entire planting" since not every single plant is showing symptoms.

Single plant: Only one plant is affected; other plants of the same type are healthy.

Plant disease - general terms

Abiotic: Non-living (e.g. air pollution injury is an abiotic problem).

Biotic: Living, relating to living (e.g. Cytospora canker is a fungal disease and, therefore, it is a biotic problem).

Causal agent or causal organism: An agent or organism causing a particular disease (e.g. the bacterium *Erwinia amylovora* is the causal agent of fire blight).

Host: A plant which is harboring a pathogen. This term is also used in reference to a plant which may be susceptible to a particular pathogen.

Infection: The entry of an organism into a host and the establishment of a parasitic relationship.

Localized infection: An infection which occurs at a specific site with the pathogen not moving much beyond the site of infection. The pathogen cannot move internally throughout the plant.

Local lesion: A localized spot produced on plant parts as a result of a localized infection.

Parasite: An organism which obtains food materials from another living organism. An obligate parasite can grow only on living tissue; it cannot feed on dead matter. A non-obligate parasite can grow on dead matter as well as on living tissues.

Pathogen: An organism or virus capable of causing disease in a particular plant or plant group.

Saprophyte: An organism which obtains food materials from dead organic matter. A saprophyte often colonizes tissue that has already been killed by a parasite.

Secondary organism: A pathogen or saprophyte which normally only attacks a plant that has been weakened by other causes (e.g. drought) and is not the primary cause of the plant problem.

Systemic: Spreading internally throughout the plant body. Refers to a **pathogen** (e.g. Fusarium wilt of tomato - the fungus infects through the roots and, once in the vascular tissue, can move into the stem) or to a **chemical** (e.g. Benomyl is a systemic fungicide). Contrast this with a local lesion or localized infection (see above).

Vector: An organism able to transport and transmit a pathogen to a host (e.g. aphids can serve as vectors or carriers for certain viruses).

Wound parasite: A parasitic organism which can only become established in a host if there is a wound for its entry.

Fungi and their structures

Conidium (pl. conidia): An asexual fungal spore.

Conk (also: bracket fungus, shelf fungus): A large shelf-like fungal fruiting body characteristic of many wood rotting fungi. Conks can be observed growing out of decaying trees, stumps and wood products.

Fruiting body: A complex fungal structure containing spores (e.g. pycnidium).

Mold: Any "fuzzy" fungal growth which may be observed on decaying matter or on plant surfaces.

Mushroom (also: toadstool): Umbrella shaped fungal fruiting structures. Mushrooms can be observed at the base of trees, in lawns, woods, at the supermarket, etc.

Mycelium (pl. mycelia): A mass of fungal threads or strands that make up the "body" of the fungus (sometimes referred to as "mold"). Each individual strand is considered a hypha (pl. hyphae) or hyphal strand.

Pycnidium (pl. pycnidia): A fungal fruiting body. Pycnidia may appear as tiny black dots or specks in diseased tissue. Spores are produced in pycnidia.

Rhizomorph: A cord-like strand made up of many fungal strands. Rhizomorphs are commonly produced by many wood decay fungi.

Sclerotium (pl. sclerotia): A hard, compact, rounded mass of fungal tissue. This structure is highly resistant to adverse environmental conditions, which enables the fungus to survive such conditions.

Sorus (pl. sori): A compact mass or cluster of spores borne on short stalks, particularly in the rust and

smut fungi. (The spore structures produced on the underside of fern leaves are also called sori.)

Spore: A one or more celled microscopic reproductive unit. A spore germinates (similar to a seed) and produces a new fungus growth or infection. Some fungi can be distinguished from one another based on their spore characteristics.

Sporulate: To produce spores.

Laboratory and Greenhouse Tests

Culture (verb): To grow a microorganism on a prepared food substance (culture medium).

Culture (noun): A microorganism maintained on a prepared food material. Cultures are made in order to isolate the pathogen from diseased plant material.

Culture medium: The prepared food substance on which microorganisms are grown. The media used in the Plant Disease Diagnostic Laboratory are gelatin-like substances which contain agar and various nutrients. Some culture media are selective, allowing only certain microorganisms to grow.

ELISA: This stands for Enzyme-Linked Immunosorbent Assay. This highly sensitive test is used to identify viruses present in plant tissue. In addition to viruses, it is used to detect the bacteria responsible for bacterial leaf scorch of shade trees.

Incubate: The process of placing a diseased plant or plant part in a high humidity/high moisture "chamber" in order to encourage the pathogen to grow out of the infected tissue. This procedure is also used to encourage the pathogen to produce spores for the purpose of identification.

Indicator plant: A plant which reacts to a certain pathogen with obvious and distinctive symptoms. In the Diagnostic Laboratory, we use indicator plants to aid in the detection and/or identification of virus problems.

Isolate: To separate a microorganism from a host plant by growing the organism on a culture medium. This procedure makes it easier to identify the organism(s) which may be involved in a disease situation.

PCR: Polymerase Chain Reaction, which rapidly duplicates specific DNA molecules in response to temperature changes in a computer-controlled heater.

[back to Table of Contents](#)