United States Department of Agriculture

Postentry Quarantine Manual

When using pesticies, read and follow all label instructions.

First Edition Issued 2010

Postentry Quarantine

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Introduction

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Purpose

The *Postentry Quarantine (PEQ) Manual* enables State inspectors to perform the following tasks:

- Complete appropriate form for the Permit Unit (PPQ Form 546 **only**)
- Complete appropriate forms for the Postentry Quarantine Unit (PEQU)
- Conduct a survey of the growing site to determine whether to approve the site

- Inspect postentered plant material during the growing period for pests (primarily plant pathogens)

Scope

The Postentry Quarantine Manual covers procedures for conducting PEQ tasks beginning with the request to approve a growing site and ending with the release or refusal of the plant material.

The manual is divided into the following chapters:

The manual also includes 10 appendixes, a Glossary, and an Index.

The *Introduction* contains basic information about the Postentry Quarantine Manual. This chapter includes the manual's purpose, scope, users, and application; a list of related documents that provide the authority for the manual's content; directions about how to use the manual; and the conventions (unfamiliar or unique symbols and highlighting) that appear throughout the manual.

The *Preparation* provides an orientation to conducting a postentry quarantine inspection including the necessary and needed forms, tools and equipment, and warnings for personal and inspectional safety.

The *Procedures* provide an overview of growing site inspections including inspector authority, site waivers, and disposal procedures.

Inspecting Postentry Quarantine Growing Materials provides procedures for inspecting PEQ growing materials including how plants may enter the country,

general inspection guidelines, detailed inspection procedures, pest identification procedures, and how to record inspection results.

Descriptions of Postentry Quarantine Material Release Procedures provides an overview of the criteria needed to release healthy PEQ material from quarantine.

Responsibilities of State and Federal Inspectors provides a breakdown of the specific responsibilities of both State and Federal PEQ inspectors.

The *List of Disease Circulars; Alphabetical List of Diseases; Plant Pathogenic Organisms of Interest on Postentry Plants*; and *Disease Circulars* provide different avenues for accessing information regarding the different disease circulars and plant pathogenic organisms.

The *Appendixes* contain supplementary information **not** appropriate for other components of topics, explanations, and elaborations **not** essential to the manual but helpful to the user, and information that interrupts the application of the information or makes the information more difficult to follow.

The *Glossary* defines specialized words, abbreviations, and acronyms associated with postentry quarantine. The Index contains topics and links or page numbers for quick reference.

Users

The *Postentry Quarantine Manual* is written for use by State inspectors performing PEQ duties for Plant Protection and Quarantine (PPQ). The secondary users of this manual are PPQ Postentry Quarantine Liaison Officers (PEQLO) and Investigative and Enforcement Services (IES) Investigators.

Related Documents

The following documents are related to this manual:

- 7 CFR 319.37 (Postentry Quarantine Regulation 7 CFR 319.37-7 on page G-1) and associated manual part(s)
- Compendia of nursery diseases

Code of Federal Regulations

The Code of Federal Regulations (CFRs) provide the authority for the regulatory action taken and are enforced by CBP and PPQ. The restrictions and prohibitions listed in this manual are covered by 7 CFR 319.37-7.

Application

The *Postentry Quarantine Manual* informs PPQ officers and State inspectors about how to:

- Approve or disapprove postentry growing sites
- Complete forms associated with the PEQ program
- Handle violations (especially violations of the conditions of entry listed on PPQ Form 546)
- Inspect nursery stock for plant pathogens
- Provide the basic knowledge of practical application for the program

Conventions

Conventions are established by custom and are widely recognized and accepted. Major conventions used in this manual follow.

Advisories

Advisories are used throughout the *Postentry Quarantine Manual* to bring important information to your attention. Please carefully review each advisory. The definitions coincide with American National Standards Institute (ANSI), and are in the format shown below.

DANGER
DangerTable message is used in the event of imminent risk or death of serious injury.

WARNING
WarningTable message to be used in the event of possible risk of serious injury.

CAUTION
CautionTable message is used for tasks involving minor to moderate risk of injury.

NOTICE
NoticeTable message is used to alert a reader of important information or Agency policy.

SAFETY
SafetyTable message is used for general instructions or reminders related to safety.

Boldface

Boldface type is used to emphasize important words throughout the *PEQ Manual*. These words include: **cannot, do not, does not, except, lacks, must, neither, never, nor, not, only, other than**.

Bullets

Bulleted lists indicate that there is **no order** to the information being listed.

Change Bar

A black change bar (*see* left margin) is used to indicate a change and appears on the revised page. Unfortunately, change bars **do not** always appear when text is merely deleted. Change bars from the previous update are deleted when the chapter or appendix is revised.

Chapters

This manual contains the following chapters: Introduction; Procedures; Reference; Inspecting Postentry Quarantine Growing Material; Descriptions of Postentry Quarantine Material Release Procedures; Responsibilities of State and Federal Inspectors; List of Disease Circulars; Alphabetical List of Diseases; Plant Pathogenic Organisms of Interest on Postentry Plants; and Disease Circulars.

Contents

Every chapter section has a table of contents that lists the heading titles within.

Control Data

Control data is located at the top and bottom of each page to help manual users keep track of where they are in the manual and be aware of updates to specific chapters, sections, appendixes, etc. in the manual. At the top of each page is the chapter title and first-level heading for that page. At the bottom of each page is the transmittal number (month, year, number), manual title, page number, and unit responsible for content. To track revisions to the *Postentry Quarantine Manual* use the control data.

Decision Tables

Decision tables are used throughout the manual. The first and middle columns in each table represent conditions, and the last column represents the action to take after all conditions listed for that row are considered. Begin with the column headings and move left to right, and if the condition **does not** apply, continue one row at a time until you find the condition that does apply.

Table 1-1 How to Use Decision Tables

If you:	And if the condition applies:	Then:
Read this column cell and row first	Continue in this cell	TAKE action listed in this cell
Find the previous condition did **not** apply, read this column cell	Continue in this cell	TAKE action listed in this cell

Examples

Examples are used to clarify a point by applying it to a real-world situation. Examples always appear in boxes as a means of visually separating them from the other information contained on the page.

EXAMPLE Examples are graphically placed boxes within the text as a means of visually separating information from other information contained on the page. Examples always appear in a box like this.

Footnotes

Footnotes comment on or cite a reference to text and are referenced by number. The footnotes used in this manual include general text footnotes, figure footnotes, and table footnotes.

General text footnotes are located at the bottom of the page.

When space allows, figure and table footnotes are located directly below the associated figure or table. However, for multipage tables or tables that cover the length of a page, footnote numbers and footnote text **cannot** be listed on the same page. If a table or figure continues beyond one page, the associated footnotes will appear on the page following the end of the figure or table.

Heading Levels

Within each chapter there are four heading levels. The first-level heading is indicated by a horizontal line across both the left and right columns, and the heading follows directly below. The second-level heading is in the right-hand column with the text beginning below. The third-level heading is in the right-hand column with the text beginning below. The fourth-level heading is in the right-hand column followed by a period and leading into the text.

Hypertext Links (Highlighting) to Tables, Figures, and Headings

Figures, headings, and tables are cross-referenced in the body of the manual and are highlighted in boldface type. These appear in blue hypertext in the online manual.

EXAMPLE *See* Table 1-1 on page 1-6 in the introduction to determine where to report problems with this manual.

Indentions

Entry requirements summarized from CFRs, import permits, or policies are indented on the page.

Italics

The following items are italicized throughout the *Postentry Quarantine Manual*:

- Cross-references to headings and titles
- Publication names
- Scientific names of commodities

Numbering Scheme

A two-level numbering scheme is used in this manual for pages, tables, and figures. The first number represents the chapter. The second number represents the page, table, or figure. This numbering scheme allows identifying and updating. Dashes are used in page numbering to differentiate page numbers from decimal points.

Transmittal Number

The transmittal number contains the month, year, and a consecutively issued number (beginning with -01 for the first edition and increasing consecutively for each update to the edition). The transmittal number is **only** changed when the specific chapter sections, appendixes, or glossary, tables, or index is updated. If no changes are made, then the transmittal number remains unchanged. The transmittal number **only** changes for the entire manual when a new edition is issued or changes are made to the entire manual.

EXAMPLE 7/2011-05 is the transmittal number for this update and is located in the control data on the pages in this chapter.

7 is the month the update was issued
2011 is the year the update was issued
05 is the number (the original, new edition was 01 plus 4 updates)

Using the Manual

Review the contents of this manual to get a feel for the scope of covered material. Glance through the section you will be using and familiarize yourself with the organization of the information. Use the table of contents following each tab to find the information you need. If the table of contents is **not** specific enough, turn to the Index to find the topic and corresponding page number.

EXAMPLE To find contact information for the Maryland PEQ Liaison Officer *see* Directory of PPQ Postentry Quarantine Liaison Officers on page A-1.

Reporting Problems With or Suggestions For the Manual

Use Table 1-2 to determine where to report problems or disagreements, or improvements that directly affect the contents of the *Postentry Quarantine Manual*.

Table 1-2 Procedures to Report a Problem with the *PEQ Manual*

If you:	Then:
Are **not** able to access the online manual	CONTACT the Information Services Manuals Unit (ISMU) via email at amy.l.frevert@aphis.usda.gov or call 240-529-0352
Have a situation that requires an immediate response regarding a procedure or regulatory action	CBP: CONTACT the field office liaison through the chain of command PPQ: CONTACT Dave Farmer via email at thomas.d.farmer@aphis.usda.gov or call 919-855-7366
Have a suggestion for improving the formatting of the content (Design, layout, composition) grammar, or spelling	CONTACT ISMU via email at amy.l.frevert@aphis.usda.gov or call 240-529-0352
Disagree with the admissibility of a commodity	CBP: CONTACT the field office liaison through the chain of command PPQ: CONTACT the PPQ Regulations, Permits, and Manuals department through proper channels
Disagree with policy or procedure	CBP: CONTACT the field office liaison through the chain of command PPQ: CONTACT the PPQ Quarantine Policy, Analysis, and Support through proper channels with the reason for the disagreement and a recommendation

Manual Updates

The Information Services Manuals Unit (ISMU) electronically issues and maintains manuals on the ISMU Web site. The online manuals contain the most up-to-date information.

Immediate update revisions to the manual are issued and distributed via email to CBP Agriculture Specialists, State liaison officers, and all PPQ employees.

Each immediate update contains the following information:

- Link to access and download the online manual
- List of the revised page numbers
- Purpose of the revision[s]
- Transmittal number

Ordering Additional Manuals and Revisions

Although using the online manuals is the preferred method, APHIS employees may order hard copies of manuals from the APHIS Printing, Distribution, and Mail Services Center in Riverdale, Maryland. Visit the Riverdale Print Shop Web site for detailed information and printing costs. The ISMU is **not** responsible for printing costs.

Chapter

2

Preparation

Contents

Orientation

Review the *PEQ Manual* prior to conducting a PEQ inspection for the first time.

If possible, have an experienced inspector accompany you on one or more inspections until you become familiar with the job.

Ask your PEQLO to assist you with routine or difficult problems. (The success of this program depends on cooperation between State and Federal professionals.)

Obtain clear directions to the inspection site: commercial nursery, greenhouse, or hobbyist's home garden.

Contact the grower to arrange for each PEQ inspection appointment. (This is particularly important when dealing with hobbyists. Access is obtained and travel time is saved. Make cold-call inspections **only** as needed relative to your knowledge of the grower, State guidelines, and pest risk.)

Having an inspection appointment may seem unnecessary or contrary to standard nursery inspection procedures, but an appointment may reduce the likelihood of violations. Tell importers to do the following:

- Assure that PEQ tags are in their proper places
- Read his or her Controlled Import Permit for Postentry Quarantine (CIP) and remember to separate PEQ material from non-PEQ material
- Take the time to tidy growing areas and place dead PEQ material in trash bags for your examination

If importers **do not** take corrective measures prior to your inspection appointment, report and document violations as appropriate. Act to correct all violations.

NOTICE

If your State Department of Agriculture's policy is to do inspections without appointment, please follow that policy for PEQ articles as well.

If you have reason to believe that correct PEQ compliance is **only** occurring prior to your announced visit, conduct cold-call inspections to determine the level of actual compliance. Report and document violations as appropriate. Act to correct all violations.

State and Federal Forms

Carry all necessary State and Federal forms.

State Nursery Inspection Forms

Depending on each State's standard operating procedures, State Nursery Inspection forms **may** be needed to report that contact was made with a specific grower, and any pests found and the treatments recommended.

State Quarantine Notice Forms

Depending on each State's standard operating procedures, State Quarantine Notices may be needed to report detention of PEQ material due to infection or infestation.

PPQ Form 236, “Notice of Shipment and Report of Inspection of Imported Plants to be Grown Under Postentry Quarantine”

PPQ 236 Notice of Shipment and Report of Imported Plants to be Grown Under Postentry Quarantine on page F-3 is an official record of what was shipped to the importer and assists in verifying the following:

- Date they were received
- Kind and quantities of plants shipped
- Number of PEQ tags shipped by the PIS
- Permit and reference numbers
- Pests found and treated for at the PIS
- Requirements necessary to complete the release of the PEQ material

When the PEQ period ends, PPQ Form 236 is used to request release of the PEQ material.

State inspectors may report inspection findings directly on the back of this form throughout the PEQ period, or they may use State forms and transfer the information before sending to the PEQU.

PPQ Form 391, “Specimens for Determination”

PPQ Form 391 Specimens for Determination on page F-7 **must** be used when shipping insect or disease specimens to national identifiers.

PPQ Form 546, "Agreement for Postentry Quarantine—State Screening Notice (7 CFR 319.37)"

Read the agreement section of (PPQ 546 Agreement for Postentry Quarantine—State Screening Notice (7 CFR § 319.37) on page F-10) to the grower (owner or manager) when a PEQ shipment is first received or during the first inspection. Each letter (a. through j.) should be initialed by the applicant. Review this form again with the grower if you observe violations. Tactfully reemphasize AGREEMENT sections a. through j. Stress that the person who signs this form is the "legally accountable" person, and, therefore, **must** abide by all PEQ rules.

NOTICE
Inform the grower/accountable person that according to Federal law, no PEQ material may be legally propagated or otherwise increased and no shipment or part of a shipment may be moved to another location on the importer's property or to any other importer's property without prior approval from the State inspection authorities and written permission of the National Coordinator, Postentry Quarantine Program.

Forward copies 1 and 2 of the application for postentry permits (PPQ Form 546) to:

Head, Permit Unit
USDA, APHIS, PPQ
4700 River Road, Unit 136
Riverdale, Maryland 20737

Copy 3 of the application form should be kept by the State and copy 4 given to the importer.

NOTICE
An applicant with a level 2 e-authentication can apply online for a Postentry Permit. The application will go first to the Permit Unit to check for completeness and whether the applicant has a history with violations. The Permit Unit then forwards to the appropriate State Department of Agriculture. The site is inspected by a State Inspector and approved or disapproved. If approved, an e-permit will be issued. If disapproved, the applicant will be informed.

PPQ Form 518, "Report of Violation"

Use PPQ 518 Report of Violation on page F-9 to report violations of the PEQ permit. Know that other forms exist, relative to PEQ.

APHIS Form 7060, “Official Warning Violation of Federal Regulations”

APHIS 7060, Official Warning, Violation of Federal Regulations on page F-2 may be used to report first-time or minor violations of the PEQ permit. APHIS Form 7060 is a formal report, more formal than a warning letter, and is used for violations.

PPQ Form 569, “Release From Postentry Quarantine”

PPQ Form 569 Release from Postentry Quarantine on page F-13 is issued by the PEQ Unit in Beltsville, Maryland, and, for CNMI, Guam, and Hawaii, the Postentry Coordinator located in Honolulu, HI. This is the form that officially releases PEQ material from quarantine.

PPQ Form 587, “Application for Permit to Import Plants or Plant Products”

PPQ Form 587 Application for Permit to Import Plants or Plant Products on page F-14 is **not** used when applying to import PEQ material, but it is used for genera that are **not** Controlled Import Permit material. Keep a supply of blank forms available for issuance to potential importers.

“Controlled Import Permit (CIP) for Postentry Quarantine”

PPQ Controlled Import Permit for Postentry Quarantine on page F-16 is valid for three years **or** until the maximum quantity of plants listed on the permit has been met, **whichever comes first**. The maximum quantity listed on the CIP is for the life of the permit, **not** each shipment. **No** amendments will be made to existing permits. If changes are required, the importer will have to apply for a new permit.

Tools and Equipment

Following is a list of tools and equipment needed to inspect plants being grown under postentry quarantine:

- Copies of PPQ Form 391, “Specimens for Determination”
- Copies or originals of all forms specific to the PEQ inspection
- State Quarantine Tags, Quarantine Tape, or similar marking equipment for detaining infected PEQ material
- Three or four plastic, heavy-duty trash bags for infected PEQ material disposal

- One hand lens
- One or two shoulder-type vials (containing 3% formaldehyde)—for nematodes
- One pair of pruning shears
- One pocket knife or similar cutting device
- *PEQ Manual*
- Three or four resealable plastic bags (sandwich to 1-gallon size) for bud wood and large disease sample mailing to identifiers
- Three or four shoulder-type vials (containing 70% alcohol)—for insects
- Three or four shoulder-type vials (empty)—for dry specimen retention
- Three or four small envelopes for shipping infected PEQ specimens to identifiers
- Two or three paper towel sheets or similar blotter paper—for possible fungal diseases

Make arrangements with the importer if large quantities of plant material need to be destroyed.

Cautions and Warnings

Personal Warnings

Inspectors should always be cautious en route to and during PEQ inspections, but probably no more so than during any other work assignment.

Experienced inspectors know to look for guard dogs, pesticide residues on plants, low-hanging steam pipes, unguarded fans, and dangerous footing. But even experienced inspectors can have accidents. Therefore, take every precaution to minimize accidents, injury, and damage to self, property, and others.

Inspectional Warnings

Genera listed in 319.37-7(b) may be unfamiliar to you. You may wish to do a computer search for pictures. Your importer’s confidence in your abilities is increased if you can identify the plant(s) you are to inspect.

You may not recognize many of the plant diseases that are PEQ significant. They either **do not** occur in the United States, are of limited distribution, or have symptoms that are similar to endemic diseases. Inspection is based on disease signs and symptoms and it is important to recognize them. Use the

descriptions and the PEQ Circulars in the List of Circulars on page 7-1, to assist you during your inspections.

If you **cannot** identify what is causing a symptom on a PEQ plant, take a sample to your local specialist for identification. If this person **cannot** identify the specimen or suspects the disease is one of those listed as quarantine significant, contact the PEQ Coordinator.

Symptoms caused by fungi, bacteria, and nematodes include wilting, blotching, spotting, chlorosis, mottling, curling, cankers, gall, and die-back. Carefully inspect the host material for spores or fruiting bodies.

Symptoms of viral diseases include mottle, vein clearing, leaf curling, chlorosis, necrotic lesions, distortions, shortening of the internodes, stunting, enations, and color breaking in the bloom. Accurate field identifications are difficult because diagnosis is based on symptoms. Generally, there are no signs (such as fruiting bodies of fungal pathogens) produced by diseases caused by viruses. And, symptoms can be confused with those caused by drought, poor drainage, malnutrition, or injury from spray materials. When virus diseases are found, examine any domestic plants of the same genus growing nearby for similar symptoms. Such comparisons will help determine if the suspected virus was introduced with the host or occurs locally.

Refer plant diseases that are **not** positively recognized as native or already established, or **cannot** be completely explained by environmental factors, insect injury, or nutritional troubles to the PEQU, Beltsville, Maryland. Pack specimens carefully before shipping to identifiers (*see* Pest Identification Procedures on page 4-7). Sent specimens **must** be characteristic of symptoms and variations observed on the PEQ plants and described in the List of Circulars on page 7-1.

In most cases, the quarantine period for PEQ material is 2 years (or two growing seasons). Exceptions do occur. Therefore, refer to PPQ 546 Agreement for Postentry Quarantine—State Screening Notice (7 CFR § 319.37) on page F-10 for specific information.

Special Note Regarding PIS Inspections

It is important to understand that intercepted plant pests are taxonomically identified to the lowest possible taxon (usually to the species level). However, PPQ acts **only** on those pests that are or are suspected of being quarantine significant. Nonquarantine plant pests are generally allowed entry due to PPQ's lack of authority to treat these pests. Importers who receive PEQ materials infested with non-quarantine significant plant pests may complain about this policy. PPQ management is **not** indifferent to importer concerns and is reviewing this loophole. Changes are being considered to require treatments for potential viral vectors such as aphids, whiteflies, or leafhoppers at the PIS. Until this review process is complete, please understand that PPQ will **only** take action on those pests that are, by Federal law, quarantine significant.

Chapter

3

Growing Site Inspections

Contents

Overview

Growing site inspections are conducted by State (and occasionally Federal) inspectors to preapprove the area(s) where PEQ material will be grown during the PEQ period. Growing site inspections also serve to evaluate the professional capability and intent of the grower.

Four primary conditions **must** be met for a site to be approved:

- Adequate buffer distance away from plants of the same genus and/or other genera of postentry plants
- Adequate space for the growth and maintenance of the total amount of PEQ material expected to be received (the amount of material is indicated on PPQ 546 Agreement for Postentry Quarantine—State Screening Notice (7 CFR § 319.37) on page F-10)
- Easily accessible for inspection and available during the State inspector's business hours
- Facility is in a location **not** prone to theft

Your Authority

The State Plant Regulatory Official (SPRO) or designee has final authority for approval or denial of any proposed site. Even though all primary conditions may be met, a decision to deny the approval of the site may be based on the grower's professional capability and intent or the environmental conditions that could cause exotic pests to be released into the environment.

For example, if plant theft is a local problem, this could be reason for disapproving the growing site. In this instance, the importer should be allowed

to suggest and implement remedial safeguard measures that meet your satisfaction, such as fencing the property.

If a grower has habitually violated previous State quarantines or nursery treatment orders, this, too, could be grounds for disapproval. Information on habitual violations should, at minimum, accompany the application to the Permit Unit in Riverdale, Maryland.

PPQ Form 546

Complete PPQ 546 Agreement for Postentry Quarantine—State Screening Notice (7 CFR § 319.37) on page F-10 ***ONLY*** under the following conditions:

- Accountable person who signed for a company is no longer with the company
- New importer/company wishes to obtain a Controlled Import Permit for Postentry Quarantine (CIP)
- Controlled Import Permit for Postentry Quarantine expired and needs to be renewed
- Permittee wants to change the growing site or add a growing site

Section A

Section A is completed by the grower/applicant. Please ask the person completing the form to print his or her name. After the form is completed, forward it to the appropriate State regulatory official.

If, after the Controlled Import Permit for Postentry Quarantine is issued, a request is made by the importer to add additional genera to the permit, the importer **must** apply for a **new** Controlled Import Permit for Postentry Quarantine.

During your site inspection read aloud and discuss the “Agreement” section of Section A and have the grower/importer initial all subsections (a. through j.) to:

- Answer all importer questions
- Ascertain that compliance is possible
- Ensure the grower understands the legal requirements

Growing Site

Item a. All plant material will be grown on premises supervised and controlled by me, located as specified in Item 5 above, and will **not** be moved or distributed without written permission of the appropriate State or Territory Official and (**except** Hawaii, Guam, and CNMI) the Coordinator, Postentry Quarantine Program.

Approval to move or distribute the plants **must** be sent to the Coordinator on State Department of Agriculture letterhead. For movement of PEQ plants to a grower in another State, both States will need to send approval to the Coordinator.

Access

Item b. Properly identified officers, either Federal and/or State, will be given access to the premises listed in Item 5 during the inspector's regular business hours.

Distribution

Item c. No increase of these plants by cuttings, grafting, suckers, flowers, seed or air layers will be made; there will be no distribution of the plants or increase; and no cutting of flowers for sale will be made until the plants are released from postentry quarantine, or written permission of the (as in a. above).

Approval to increase the number of plants or cut flowers **must** be sent to the PEQ Coordinator on State Department of Agriculture letterhead.

Labeling

Item d. The plant material and all increase therefrom will be labeled by specific plant name, port accession number, and date of importation.

NOTICE
The tag should be placed on the first plant in a group of plants. Any additional tags for the same shipment can be placed anywhere within the group of plants. Labels should be removed by a State officer as soon as the release is received from the Postentry Quarantine Unit (PEQU).

Separation

Item e. The plant material will be separated from domestic stock of the same genus including such stock on adjoining premises, by no less that 3 meters (approximately 10 feet) and will be separated from other imported plants by the same distance.

NOTICE
Additional distance requirements should be indicated on PPQ Form 546 in the blank area of Section B-8.

Treatments

Item f. Any treatments prescribed by the officer, including destruction of the quarantined PEQ material or other plants growing on the premises, will be complied with to prevent the dissemination of a plant pest. (Special emphasis should be given to explain the need for control of aphids, whiteflies, leafhoppers, and other known viral vectors.)

Dead Plants

Item g. The appropriate State or Territory official will be notified in writing within 30 days when any abnormality is noticed in the plant material or if the plant material dies. Dead plants will be retained and collected by the State inspector for analysis. Follow disposal procedures described in Disposal Procedures on page 3-5 section in this manual.

Address Change

Item h. Notification of change of address will be sent to the appropriate State or Territorial official and (**except** Hawaii, Guam, and CNMI)) the Coordinator, Postentry Quarantine Program.

Special Requirements

Item i. Plants of *Rubus* spp. from Europe will be grown in a screen house (16 mesh per inch minimum); plants of *Chrysanthemum* spp. and *Dianthus* spp. will be grown in a greenhouse or other enclosed building.

Growing Requirements

Item j. The postentry requirements will be applied to Chrysanthemum spp. for six months after importation, to *Dianthus* spp. for 1 year after importation, and to all other genera for two years after importation.

The State official completes Section B gives copy 4 to the applicant and retains the third copy. The rest is sent to the following address:

Head, Permit Unit
USDA, APHIS, PPQ
4700 River Road, Unit 136
Riverdale, Maryland 20737

Waiver of Growing Site Inspection

It is **not** critical that you conduct a growing site inspection when a specific importer is an experienced PEQ grower, and you are knowledgeable about the following:

- Professional capability and intent of the grower
- Proposed growing site
- Site has been specifically identified and delimited

In all other situations, inspect growing sites and hold discussions with the importer to assure compliance with the PEQ growing agreement. Taking these two steps will reduce the potential for violations and minimize the potential release of exotic pests into the environment.

Even with experienced PEQ importers, it is important to annually review PEQ growing requirements, especially when new genera are imported.

If PEQ material arrives at the PIS yet there has been no growing site inspection and approval, PIS officials will contact the PEQ Coordinator to discuss the matter. Usually, PEQ materials are allowed to proceed from the port of entry if a PPQ Form 546 completed by both the importer and signed by the state is faxed to the PIS, even though a Controlled Import Permit for Postentry Quarantine has **not** been issued.

Disposal Procedures

Instruct all importers, as often as necessary, of the proper disposal procedures outlined below:

- Any and all debris or waste derived from postentry plants or plant parts **must** be burned, autoclaved, or buried at least 1 ½ to 2 feet deep; following are a few examples of such material:
  - Debris remaining after pruning (See Table 3-1 Decision Table for Handling Plant Debris or Waste on page 3-6)

- ❖ Debris that collects naturally (See Table 3-1 Decision Table for Handling Plant Debris or Waste on page 3-6)
- ❖ Excess wood left from bud grafting
- ❖ Undesirable plants the grower wants to eliminate

- ◆ Composting waste or debris from postentered plants or carrying waste or debris from postentered plants to a public landfill is prohibited
- ◆ Importers **must** notify, in writing, within 30 days, State (or Federal) inspectors for an inspection when PEQ material dies or appears infected or infested
- ◆ Importers **must** save all dead PEQ material in plastic trash bags (PEQ material may be beyond recognition when an inspection is later conducted, but safeguarding in plastic bags will reduce the likelihood of pest dissemination)
- ◆ Importers or growers **must never** dispose of any PEQ material (including waste or debris) without the prior approval of a State or Federal inspector (if the importer or grower sees dead plants or evidence of disease, that person **must** contact the State inspector immediately, moreover, if the importer or grower wants to eliminate undesirable plants, he or she should contact the State inspector prior to roguing out those undesirable plants)

Use Decision Table for Handling Plant Debris or Waste to decide whether you, as a State inspector, may allow a grower to leave plant debris or waste originating from PEQ material on the ground prior to disposing of it.

Table 3-1 Decision Table for Handling Plant Debris or Waste

If the material or waste is:	And the pathogen requiring the plant or material be grown under postentry:	Then:
A large quantity such that collection and disposal of the material would be burdensom	Is a bacterium or a fungus	Have the grower or importer collect the waste or debris and bag it prior to disposition
	Is a virus	Allow the grower or importer to leave the debris on the ground
A small quantity where collection and disposal would be reasonably easy	→	Have the grower or importer collect the waste or debris and bag it prior to disposition

EXAMPLE If a grower has planted 1,000 postentry ash trees, you require that the grower collect and bag the debris because the pest of concern, *Pseudomonas savastonoi* var. *fraxini* is a bacterium (Circular 22: Diseases of Fraxinus spp. on page 10-54). If, on the other hand, a grower plants 2,000 postentry lilac bushes (*Syringa* spp.), you could allow the grower to leave the plant debris on the ground because it would involve a large quantity of material, and the pest of concern is the Elm Mottle Virus (Elm Mottle Virus (Federal Quarantine Significant) on page 10-102).

Refrain from contacting PPQ Headquarters offices unless specifically authorized by PEQLO or by PPQ Headquarters personnel.

Chapter
4

Inspecting Postentry Quarantine Material

Contents

Overview

Plant disease symptoms caused by viruses, bacteria, and fungi **do not** necessarily appear in the same season. Hence, inspecting PEQ material two or more times, if possible, during each growing season would be best. For example, the majority of leaf spots and leaf diseases are **not** well developed before summer. Virus diseases, in general, are more conspicuous in the spring. (Some virus symptoms are masked or tend to disappear in hot weather.) Cankers of woody plants are usually visible throughout the year. Thus, it is obvious that while late spring and early summer are most satisfactory for virus inspection, mid-summer to fall will give the best results for most fungus diseases.

The principle of seasonal occurrence holds for insects also. Leaf-feeding insects in larval and adult stages may appear in May and June and be entirely absent in mid-summer and later. Insects with a long season of hibernation (many sawflies, scarabs, weevils) spend a relatively short season on the above-ground portions of plants and may be missed unless two or more inspections are made. While plants are frequently fumigated when pests are intercepted at the port of entry, there is always a chance of insect pest introduction. For the first inspection following PIS inspection, submit any insect damage to PEQ material or insects **not** recognized for identification.

When PEQ material is examined during the growing season, inspection timing is important. Conditions **must** be optimum for detecting the specific plant pest involved. (A portion of this manual indicates optimal inspection periods.)

Unfortunately, two scenarios are possible:

- Grower receives PEQ material through legal channels
- Grower receives PEQ material through the mail or by a courier service and avoids PIS inspection, recording, tagging, and any necessary treatments (fortunately in some of the later cases, regulatory officials are notified or in some way learn that this has occurred)

How Plants May Enter

If PEQ Material Arrives at an Inspection Station

A detailed inspection is **not** required when the PEQ material arrives at the grower/importer's location unless the State official so desires. If an inspection is done, report findings directly on the back of PPQ Form 236.

If PEQ Material Does NOT Arrive at an Inspection Station

Notify the PEQLO or State Plant Health Director (SPHD) immediately. The SPHD or PEQLO will insure that the shipment is sent to the closest inspection station no matter the number of items. If the importer **does not** have a Controlled Import Permit for Postentry Quarantine, the application form (PPQ Form 546) **must** be completed, both parts A & B before the shipment can be released from the inspection station. Violation proceedings may or may **not** be justified, and should be decided on a case-by-case basis.

NOTICE
Send all shipments to the closest inspection station. If this is **not** possible, e.g., the plants have been planted in the field, PPQ **must** issue an Emergency Action Notice (EAN) and destroy the shipment.

General Inspection Guidelines

Postentry Quarantine (PEQ) Plants Imported as Tissue Culture in Flasks

1. Postentry quarantine begins when the plants are removed from the flasks, planted in growing media, and placed in the field, greenhouse, or screenhouse.
2. Any plants **not** removed from the flasks **must** be destroyed by an approved method.
3. The **only** plants that will be released at the end of the PEQ are the ones that have been planted and inspected by the State and/or PPQ.

Inspection Requirements

Inspect plants for evidence of exotic pests **at least once** during the first year **and at least once** during the second year for plants required to be grown in postentry quarantine for two years. Inspect **at least once** for plants required to be grown in quarantine for **less than** two years (e.g., *Chrysanthemum* spp. for six months, *Hydrangea* spp. for nine months, *Dianthus* spp. for one year).

Optional Inspection

When the postentry shipment first arrives at the growing site (optional), perform the following:

1. Compare the bill of sale or invoice with PPQ Form 236. If you find any discrepancy in the number of plants or their kinds, contact the PEQLO to resolve the discrepancy or to investigate the incident.
2. Inspect plants that will be growing in proximity to the postentered material. Look especially for vectors of viruses—aphids, leafhoppers, and

whiteflies. If you find such vectors, have the grower control these pests quickly but when practical.

3. If you detected any violations during your inspection, get with your PEQLO to investigate and document the violation.

First Inspection

During The First Growing Season

It is best if you inspect the postentered material twice during the first growing season.

1. To prepare for your inspection, look up the scientific name of the postentered plant(s) in Plants Growing in Postentry Quarantine on page H-1. Use the information under the appropriate columns to schedule your inspections and to know for what symptoms to be on the alert. Schedule your inspections according to your local climate and weather patterns. If **not** listed in Disease and Pathogenic Organism Circulars on page 10-1 (fruits and nuts overall), generally inspect the plants for symptoms of diseases at different times of the growing season.
2. Enter the results of your inspection on the back of the PPQ Form 236—even if those results are negative.

Second Inspection

During The Second Growing Season

It is best if you inspect the postentered material twice during the second growing season.

1. To prepare for your inspection, look up the scientific name of the postentered plant(s) in Appendix H, Plants Growing in Postentry Quarantine on page H-1. Use the information under the appropriate columns to schedule your inspections and to know for what symptoms to be on the alert. Schedule your inspections according to your local climate and weather patterns. If no specific symptom is listed in the symptom column in Appendix H Plants Growing in Postentry Quarantine on page H-1, generally inspect the plants for symptoms of diseases at different times during the growing season.
2. Enter the results of your inspection on the back of PPQ Form 236—even if those results are negative.
3. Based on the inclusive inspection results during the two growing seasons, recommend (or don't recommend) release of the postentered material. If you recommend release, sign the appropriate Block on the bottom of the back side of PPQ Form 236. Get your supervisor's concurrence and have him or her sign the form in the appropriate Blocks next to yours. If both

you and your supervisor agree that the plants should **not** be released from detention, contact your PEQLO.

4. Count all the plants, if feasible, that are alive from the original shipment. Enter both numbers on the back of PPQ Form 236 as “23 plants alive out of the original 98."
5. Send the completed and signed PPQ Form 236 to your PEQLO. That person will review the form and send it to the PEQU. This Unit and the Postentry Coordinator for Hawaii, Guam, and CNMI are the **only** officials authorized to release the material to the grower or importer.

Detailed Inspection Procedures

Inspection of Existing Documents

1. Thoroughly inspect all documents to verify the amount and kind of plant material grown.
   A. Review **all** permit conditions. Examples can be located in Figure F-10. through Figure F-10.
2. Have the importer explain and/or correct any discrepancies observed.
3. Replace lost documents by contacting the PEQ Coordinator. Additional tags, as needed, can also be obtained by contacting the Coordinator.

Inspection of Growing Site

1. Determine if the growing site is indeed the approved site as stipulated in the original request.
2. If the importer is in compliance, do nothing.
3. If the importer is **not** in compliance, have the importer correct the situation to your satisfaction.
4. Report any serious violations to the PEQLO.
5. If a new growing site is approved for an existing permit, the State PEQ should forward the new PPQ Form 546 to the Permit Unit in Riverdale, Maryland. Attach a note stating: “PPQ Form 546 is a revision to Permit Number **fill in number**.”

Use Table 4-1 when inspecting PEQ plants or plants adjacent to PEQ plants

Table 4-1 Pest Findings and Appropriate Action

If you find:	Then you[1]:
Vector insect (whiteflies, aphids, or leafhop-pers)	INSTRUCT the owner to control the pest immediately. If he or she **does not** comply, issue a violation notice. Submit a sample of the pest to the State or University entomolo-gist for identification
Nonvector insect	Submit a sample of the pest to the State or University entomologist for identification
Symptoms or sign of PEQ disease or PEQ suspect disease (*see* Plants Growing in Postentry Quarantine on page H-1)	
Symptoms of signs of non-PEQ disease	

1 If the State or University entomologist or plant pathologist **does not** recognize the insect or the symptoms or signs of the disease to be something that has been reported in that State, immediately contact the National PEQ Coordinator.

PEQ Plants Inspection

1. Inspect the PEQ plants for insects and diseases. Count the plants.
2. If you find insects such as whiteflies, aphids, or leafhoppers, have the grower control them immediately since many are known vectors of viruses. Importer compliance is critical.
3. Collect pest specimens for determination and submit to specialist identifiers (*see* Submitting Invertebrate Pests for Identification on page 4-8 andSubmitting Plant Diseases for Identification on page 4-10).
4. Report all of your findings on the back of PPQ Form 236. Record the general condition of the plants and the cause of death of any plants on PPQ Form 236.

NOTICE

If you determine the grower/importer can no longer continue growing PEQ material before the material is released, there are two options available to the grower: 1) dis-pose of all PEQ material using approved dispoal methods and contact the PEQLO and Coordinator or PEQP; 2) sell or give the PEQ material to another approved PEQ material grower within the same State with State approval. Contact the Coordinator of PEQP to obtain written approval and PPQ Form 236 for the replacement grower.

Nearby Plants Inspection

1. Inspect nearby plants for insects and signs and symptoms of disease.
2. Report any findings to the importer and request treatments for pest elimination.
3. If you find insects such as whiteflies, aphids, or leafhoppers, have the grower control them immediately since many are known vectors of viruses. Importer compliance is critical.

4. Collect pest specimens for determination and submit to specialist identifiers (*see* Submitting Invertebrate Pests for Identification on page 4-8 and Submitting Plant Diseases for Identification on page 4-10).
5. If the importer fails to control potential vector pests upon your request, document the violation. You may also quarantine surrounding areas if infested.
6. Dispose of dead and diseased PEQ material and any other plant material deemed infected/infested with quarantine-significant pests by applying the disposal procedures established in this manual.

NOTICE

The plant material will be separated from domestic stock of the same genus, **including** such stock on adjoining premises, by **no less than** three meters (approximately ten feet) and will be separated from other imported plants by the same distance.

PEQ Tags Inspection

Look for PEQ tags. Replace lost or missing tags. The PEQLO can request replacement tags by contacting:

Dave Farmer
National Coordinator, Postentry Quarantine Program
Field Operations Manager
USDA, APHIS, PPQ, AQI
920 Main Campus Drive, Suite 200
Raleigh, NC 27606
Tel: 919-855-7366
Fax: 919-855-7390

Confiscate and destroy any old PEQ tags that no longer label active PEQ material.

NOTICE

Lack of tag could be an indication the shipment was **not** inspected at an inspection station. If the State inspector **does not** have a PPQ Form 236 for this shipment and the grower **cannot** produce this document, a decision will need to be made. If the shipment has just arrived and can be sent to the closest inspection station, do so. If it has been planted on site, destroy it. Contact the SPHD for aid in doing an Emergency Action Notice (EAN).

Pest Identification Procedures

Approach each inspection with the question, “Does this importation carry any pest that is new or rare in the United States?” A new pest may be present in a single plant. It is your task to find it.

Take specimens you **cannot** identify to your local identifier specialists. PPQ Form 391 Specimens for Determination on page F-7 **must** be completed for any specimens they **cannot** identify and they **must** be sent by overnight mail.

When suspect or actual pests are found, follow the guidelines below.

Submitting Invertebrate Pests for Identification

Use the following procedures for preparing specimens for identification. Treat or safeguard all host material to eliminate pest risk. Rearing intercepted specimens is prohibited without the proper authority. **Never** attempt to rear plant pests without authorization from the following:

Permits, Registration, Imports, and Manuals (PRIM) Staff
4700 River Road, Unit 133
Riverdale, Maryland 20737-1236

Arthropods

For guidance in preserving insects, refer to any of the following publications:

- USDA Miscellaneous Publication No. 1443, *Insects and Mites: Techniques for Collection and Preservation*, edited by G. C. Steyskal, W. L. Murphy, and E. M. Hoover, 1986
- *An Introduction to the Study of Insects*, Borror, Triplehorn, and Delong

Use Table 4-2 on page 4-8 to determine how to preserve your specimen.

Table 4-2 Decision Table for Preserving Specimens

If specimen belongs to this order:	Then preserve specimen using this method:
Acarina *Coleoptera* *Dermaptera* *Diptera* *Heteroptera* *Homoptera*[1] *Hymenoptera* *Isoptera* *Lepidoptera* (immatures) *Orthoptera* (immatures) *Thysanoptera* (adults)[2]	In alcohol *See* Preserving Specimens in Alcohol on page 4-9
Homoptera on host material (scale insects and immature psyllids) *Lepidoptera* (adults) *Orthoptera* (adults)	Dry mounting *See* Preserving Dry Specimens on page 4-9

1 **Except** whiteflies, scales, and immature psyllids on host material.

2 Add a few drops of vinegar (acetic acid) to the alcohol in vial.

Preserving Specimens in Alcohol

Adults. Kill adults by placing them in 70% alcohol.

Larvae. Use the following instructions to kill larvae:

1. Place larvae in water.
2. Slowly bring water to boiling point.
3. Allow specimen to cool down.
4. Place specimen in a vial with alcohol.

Select shoulder-type vials over shell vials because they are stronger and provide better protection for the specimens. Fill vials three-quarters full with alcohol and make sure the stoppers fit securely. Bleed air pressure when necessary. For delicate specimens, place wadded paper within the vials to minimize specimen movement. Use screw-cap vials for small specimens. Avoid using cork stoppers because they allow alcohol to evaporate and could result in specimen loss during extended storage.

Preserving Dry Specimens

Make sure all specimens are dead. Use one of the following killing agents or seek instructions from the Identifier for alternative killing measures:

- Cyanide
- Ethyl acetate
- Trichoroethylene

CAUTION

Label all killing bottles with the “POISON.” Use killing agents with care and follow the label directions.

Pin adult specimens of *Lepidoptera* and *Orthoptera* on pinning blocks before shipping. Pin the styrofoam blocks to the bottom of the pinning box. Use small pinning boxes and place these, snugly padded, inside a shipping box. Seek instructions from the Identifier for additional information.

Partially dry host material with insects (e.g., scale insects and whiteflies) before placing in the container. Unless the host material is thoroughly dry, pack to permit drying after closure of container without damaging specimens.

Nematodes

Use the following instructions when preserving nematodes:

1. If you are forwarding nematode-infested host material, place material in a plastic bag to prevent the host material from drying.
2. Separate nematodes from infested material and place in a vial of water. Slowly apply heat until the nematodes stop moving. **Do not** overheat!
3. Prepare either of the fixatives 3% formaldehyde or TAF (*see* Table 4-3).

Table 4-3 Instructions for Preparing Fixatives

If preparing this fixative:	Follow this recipe:
3% formaldehyde	1 part formalin + 12 parts water
TAF	7 ml formalin + 2 ml triethanolomine + 91 ml water

4. Add to the vial containing the specimens a volume of double strength fixative equal to the volume of water in the vial.
5. Place cysts of *Globodera* spp., mature females of *Meloidogyne* spp., and other non-wormlike nematodes, directly into single strength fixative without heating.

Submitting Plant Diseases for Identification

Use Table 4-4 as a guide when examining plants.

Table 4-4 Comparing Symptoms

Symptoms caused by fungi, bacteria, and nematodes:	Symptoms caused by viruses:
◆ Blotching ◆ Cankers ◆ Chlorosis ◆ Curling ◆ Die-Back ◆ Galls ◆ Mottling ◆ Spotting ◆ Wilting	◆ Bloom color breaking ◆ Chlorosis ◆ Distortions ◆ Enations ◆ Leaf curl ◆ Mottle ◆ Necrotic lesions ◆ Shortening internodes ◆ Stunting ◆ Vein clearing

Virus symptoms are similar to:

- Drought
- Malnutrition
- Poor drainage
- Spray injury

Selecting Material

Because diseases have complex life cycles and specimens of different stages of the disease life cycle are helpful in making identifications, select material showing as many stages of disease life cycle as possible. Early stages of the disease may show important diagnostic signs and symptoms, while older material may have the perfect stage of a fungus. Send an ample amount of diseased material.

Since some diseases may be identified by symptoms, when possible, ship disease specimens in a natural state to the Identifier. If the host material becomes dried, molded, shriveled, or decayed, symptoms may be modified or destroyed. If the material is soft or pulpy, partially dry the material and pack between sheets of stiff, absorbent paper to keep the diseased area flat. **Do not** fold leaf specimens. Partially dry succulent leaves before shipping.

For virus suspects, prepare the sample as follows:

1. Remove a branch with leaves or whole plant showing symptoms. Leaves or whole plant should **not** be dry or brittle.
2. Place in a resealable, plastic bag (**no** wet paper towels). Remove as much of the air as possible and close tightly.
3. Forward as quickly as possible to your local virologist.

If there is **no** state virologist, forward the sample along with PPQ Form 391 by overnight express to:

Dr. Joseph Foster
USDA, APHIS, PPQ
Building 580 Powder Mill Rd.
Beltsville, MD 20705

FAX or email a copy of PPQ Form 391 to the National Coordinator of Postentry Quarantine Programs:

Dave Farmer
National Coordinator, Postentry Quarantine Program
Field Operations Manager

USDA, APHIS, PPQ, AQI
920 Main Campus Drive, Suite 200
Raleigh, NC 27606
Tel: 919-855-7366
Fax: 919-855-7390
Email:Thomas.D.Farmer@aphis.usda.gov

PPQ Form 391 “Specimens for Determination”

See PPQ Form 391 Specimens for Determination on page F-7 for an example of Form 391

NOTICE

PPQ Form 391 is the **only** form approved for use by the U.S. National Museum when submitting specimens for determination. All other forms may be rejected and may cause identification delays. Complete a second or tird form if you submit two or three different pests for determination. (Each form and speciment may need to go to different identifiers working in different labs.)

Table 4-5 Instructions for PPQ Form 391 (page 1 of 2)

Block:	Instructions:
1. Collection number	Use any numbering system that corresponds to your State's inspection and interception activities (optional)
2. Date	Enter as appropriate.
3. Submitting Agency	Enter as appropriate.
4. Name of sender	Enter as appropriate.
5. Type of property	Enter as appropriate.
6. Address of sender	Enter as appropriate.
7. Name and address of property or owner	Enter as appropriate.
8. Reason for identification	◆ Mark box B or C (the one that best describes your reason for submitting this pest) ◆ Mark box L and add the words “Postentry Material”
9. Explanation	If prompt or urgent identification is requested, please provide a brief explanation under Block 22—remarks
10. Host information	Give scientific name of the host material
11. Quantity of host	◆ Write the exact number of plants that were received by the importer ◆ Write an estimated number of plants affected by the pest you are submitting for identification
12. Plant distribution	Mark the box that best describes the amount of host material in the nursery, greenhouse, or immediate environment
13. Plant parts affected	Mark the box or boxes that indicate where on the host you actually found the pest
14. Pest distribution	Mark the box that best describes the amount of pest infestation

Table 4-5 Instructions for PPQ Form 391 (page 2 of 2)

Block:	Instructions:
15. Unnamed block—this block is **only** used for submission of insects, nematodes, or mollusks. Skip this block if you are submitting diseased specimens for determination	◆ Mark the box that tells whether the pest is an insect, nematode, or mollusk. ◆ Write in the appropriate life stage box how many alive or dead specimens were present at the time of your inspection.
16. Sampling method	Use words such as: ◆ Berlese Funnel ◆ Centrifuge ◆ Dissection ◆ Filtration ◆ Hand Sampling
17. Type of trap and lure	**Do not** complete this block unless it specifically applies
18. Trap number	**Do not** complete this block unless it specifically applies
19. Plant pathology—plant symptoms	This block is **only** used for submission of plant pathology specimens. Mark the box that best describes what you observed during your inspection.
20. Weed density	**Do not** complete this block unless it specifically applies.
21. Weed growth stage	**Do not** complete this block unless it specifically applies.
22. Remarks	Write the PEQ permit number, reference number, country of origin, and any other location information here that would help you or others find the PEQ material at a later date. Place urgent shipping information here (from Block 9).
23. Tentative determination	Write the scientific name of the pest. In the case of viruses or when you **do not** know the scientific name, the common name of the pest is acceptable. **Never** leave this block blank. At least indicate virus, fungus, disease, etc.
24. Determination and notes	**Do not** write in this area

PPQ Form 236 “Notice of Shipment and Report of Inspection of Imported Plants to be Grown Under Postentry Quarantine”

Recording Inspection Results

See PPQ 236 Notice of Shipment and Report of Imported Plants to be Grown Under Postentry Quarantine on page F-3.

Complete **only** the back of this form in the area entitled “Inspection Report.”

Table 4-6 Instructions for PPQ Form 236

Block:	Instructions:
Plants imported	Write the genus and species of the host imported
No.	Write the number of live plants received by the importer

Table 4-6 Instructions for PPQ Form 236

Block:	Instructions:
Date and findings	If at all possible, use one box for each inspection—record the following information: ◆ Write any pests observed ◆ Write any noticeable growth conditions observed ◆ Write the inspection date ◆ Write the number of live plants remaining When you require treatment for arthropods, including insects, provide a copy of the State inspection form to the PEQLO.
Recommend for release	**Do not** complete this section until after the final PEQ inspection—release procedures are covered in Description of Postentry Quarantine Material Release Procedures on page 5-1
Released from detention	**Do not** write in this section of the report

Chapter 5

Description of Postentry Quarantine Material Release Procedures

Overview

Use the following criteria when releasing healthy PEQ material from quarantine:

1. State inspector completes a final inspection (record on the back of PPQ Form 236, copies 4 and 5, the number of plants remaining).
2. Final inspection should report “no quarantine-significant pests found.”
3. State inspector completes copies 4 and 5 of PPQ Form 236. Once the copies are completed, the State inspector gives the copies to his or her supervisor. The State supervisor reviews and signs both copies of the completed form. The State then forwards the completed and signed copies to the PEQLO. (*See* PPQ 236 Notice of Shipment and Report of Imported Plants to be Grown Under Postentry Quarantine on page F-3.) If the State Department of Agriculture **does not** want to have a copy of the PPQ 236 signed by the Coordinator, Postentry Quarantine Program, one copy should be forwarded to the PEQLO and the other destroyed.
4. PEQLO reviews copies 4 and 5 of PPQ Form 236 received from the State. If the PEQLO concurs with the State, the officer recommends release and writes on or stamps copies 4, 5, and 6 (copy 6 **only** if the PEQLO accompanied the State Inspector on one or both of the inspections) with “Recommend Release” and signs all three copies. The three copies of the signed form (4, 5, and 6) are forwarded to the PEQP. (*See* PPQ 236 Notice of Shipment and Report of Imported Plants to be Grown Under Postentry Quarantine on page F-3.)
5. Completed PPQ Form 236 **must** be reviewed and signed by the Coordinator for the Postentry Quarantine Program. Mail or email scanned copies to the following address:

   Dave Farmer
   National Coordinator, Postentry Quarantine Program
   Field Operations Manager
   USDA, APHIS, PPQ, AQI
   920 Main Campus Drive, Suite 200
   Raleigh, NC 27606
   Phone: 919-855-7366
   FAX: 919-855-7390
   email: Thomas.D.Farmer@aphis.usda.gov

NOTICE
It is very important that all copies of PPQ Form 236 be removed from both the State and PEQLO's files when a shipment is recommended for release.

6. Importer receives a formal release notice (PPQ Form 569) from the PEQP. (Copies are sent to State and PEQLO.)

NOTICE
PEQ material **must not** be sold until the release process is complete.

NOTICE
If State inspectors hold/quarantine PEQ material beyond the normal detention period for further observation or final treatments, etc., the PEQLO and the PEQP should be notified.

Chapter 6

Responsibilities of State and Federal Inspectors

Contents

Overview

The PEQ program is a cooperative Federal–State undertaking. By agreement, State inspectors who have specialized training do field inspections of PEQ material. (Generally, State inspectors are more knowledgeable about local growing conditions and circumstances and have a working relationship with the importers.) Federal officers provide support and administrative roles.

Liaison Officer Responsibilities

- Assist State inspectors in difficult matters especially with regard to inspections, interceptions, PEQ material disposal, and violations
- Assist State inspectors with inspections of PEQ material when State inspectors are sporadically unable to perform this function
- Assist State inspectors when extending quarantine periods due to signs, symptoms, or pest infestations found during final inspections
- Concur or deny requests for PEQ releases sent by State inspectors on behalf of importers; send approved requests to PEQU (inaccurate or incomplete PPQ Form 236s **must** be returned to the State officials for correction or completion)
- Maintain a file on all released PEQ material for a period of time established by the PEQU (the period is generally two years)
- Review all PEQ documents prepared by State and Headquarters Units and process according to established procedures
- Train and assist State inspectors in proper PEQ inspection procedures, distribute PEQ information and new manual parts to State inspectors, and maintain an active file on all material currently under PEQ quarantine

When delays in receiving permits occur, contact the following:

Head, Permit Unit
USDA, APHIS, PPQ
4700 River Road, Unit 136
Riverdale, Maryland 20737

When delays occur with regard to inspections or other difficulties, contact the following:

Dave Farmer
National Coordinator, Postentry Quarantine Program
Field Operations Manager
USDA, APHIS, PPQ, AQI
920 Main Campus Drive, Suite 200
Raleigh, NC 27606
Tel: 919-855-7366
Fax: 919-855-7390

State Inspector Responsibilities

- Conduct all PEQ inspections according to established guidelines, guidelines are found in this manual and in M 319.37-19, and is also available from the PEQLO and PPQ
- Conduct the PEQ site inspection; if a new growing site is approved for an existing permit, the State PEQ official should forward the new PPQ Form 546 to the Permit Unit in Riverdale, Maryland, however, attach a note stating that PPQ Form 546 is revising the former permit—include the permit number
- Document and report importer violations to PEQLO
- Extend quarantine periods according to PPQ direction when signs, symptoms, or pests are present during the final PEQ inspection or when a shipment is commingled with a later-arriving shipment
- Forward PPQ forms to the State supervisor who will send the forms to the PEQLO for final review and processing, this includes denials of requests for growing sites
- If you receive an improperly completed PPQ Form 236 from the PIS, contact the PEQ Coordinator
- Instruct all importers in proper PEQ material handling procedures
- Maintain an active file on all material currently under PEQ quarantine
- Seek assistance and training from PEQLO especially in difficult matters dealing with inspections, interceptions, PEQ material disposal, and violations

- Submit unidentifiable pest specimens and disease samples to local identifier authorities. If the local identifier is unable to identify the specimen submitted, forward the specimen to the PEQU for identification

Chapter 7

List of Circulars

Contents

Introduction

Use this chapter as well as chapters 8, 9, and 10 as job aides to identify plant diseases. Disease and Pathogenic Organism Circulars on page 10-1 describes diseases that are either common, quarantine significant, or both. Additional circulars will be added to this manual periodically. *See* Alphabetical List of Diseases on page 8-1 for an alphabetized list of diseases and *see*Diseases and Pathogens of Concern on page 9-1 for a list of diseases **not** included in chapter 10.

Circulars

Circular 1: Diseases of *Abelmoschus* spp., *Althaea* spp., and *Hibiscus* spp.

- Bhendi Yellow Vein-Mosaic Agent (Federal Quarantine Significant) on page 10-2
- Cotton Anthocyanosis Agent (Federal Quarantine Significant) on page 10-4
- Cotton Curliness on Hibiscus on page 10-5
- Cotton Leaf Curl Agent (Federal Quarantine Significant) on page 10-5
- Hibiscus Leaf Curl Agent on Hibiscus (Federal Quarantine Significant) on page 10-8
- Okra Mosaic Virus (Federal Quarantine Significant) on page 10-8
- Okra Yellow Leaf Curl Agent (Federal Quarantine Significant) on page 10-8

Circular 2: Diseases of *Acacia* spp.

- Acacia Rust (Federal Quarantine Significant) on page 10-8

Circular 3: Diseases of *Acer* spp.

Circular 4: Diseases of *Actinidia* spp.

Circular 5: Diseases of *Aesculus* spp.

Circular 6: Diseases of *Anacardium* spp.

Circular 7: Diseases of *Berberis* spp., X *Mahoberberis* spp., and *Mahonia* spp.

Circular 8: Diseases of *Blighia* spp.

Circular 9: Diseases of *Bromeliaceae* spp.

Circular 10: Diseases of *Brugmansia* spp. and *Datura* spp.

Circular 11: Diseases of *Carica* spp.

Circular 12: Diseases of *Cedrus* spp.

Circular 13: Diseases of *Chrysanthemum* spp. (*Dendranthema*), *Leucanthemella serotin*a, and *Nipponanthemum nipponicum*

Circular 24: Diseases of *Humulus* spp.

Circular 25: Diseases of *Hydrangea* spp.

Circular 26: Diseases of *Jasminum* spp.

Circular 27: Diseases of *Juniperus* spp.

Circular 28: Diseases of *Larix* spp.

Circular 29: Diseases of *Ligustrum* spp.

Circular 30: Diseases of *Litchi* spp.

Circular 31: Diseases of *Malus* spp. and *Pyrus* spp.

Circular 32: Diseases of *Mangifera* spp.

Circular 33: Diseases of *Morus* spp.

Circular 34: Diseases of *Olea* spp.

Circular 35: Diseases of *Passiflora* spp.

Circular 36: Diseases of *Philadelphus* spp.

Circular 37: Diseases of *Picea* spp.

Circular 38: Diseases of *Pinus* spp.

Circular 39: Diseases of *Populus* spp.

Circular 40: Diseases of *Prunus* spp.

Circular 41: Diseases of *Pseudolarix* spp.

Circular 42: Diseases of *Pseudostuga* spp.

Circular 43: Diseases of *Punica* spp.

Circular 44: Diseases of *Quercus* spp.

Circular 45: Diseases of *Ribes* spp. (Grossularia)

Circular 46: Diseases of *Rosa* spp.

Circular 47: Diseases of *Rubus* spp.

Circular 48: Diseases of *Salix* spp.

Circular 49: Diseases of *Sorbus* spp.

Circular 50: Diseases of *Syringa* spp.

Circular 51: Diseases of *Ulmus* spp.

Circular 52: DIseases of *Vaccinium* spp.

Circular 53: Diseases of *Watsonia* spp.

Circular 54: Diseases of Ziziphus spp.

Chapter

8

Alphabetical List of Diseases

Chapter 9

Diseases and Pathogens of Concern

On Postentry Genera With No Circulars

Contents

Introduction

The following list of hosts and plant pathogenic organisms includes those for which there are no Circulars.

Abelmoschus spp. (okra)

- Cotton Anthocyanosis Agent
- Okra Mosaic Virus
- Okra Yellow Leaf Curl Agent

Blighia

- Okra Mosaic Virus

Bromeliaceae

- *Puccinia pitcairniae* Lagh.
- *P. tillandsiae* Cummins & Pollack—in Florida
- *Uredo nidularii* P. Henn
- *Ustilago tillandsiae* Patterson

NOTICE
The family Bromeliceae is on the list as Postentry for HI **only**.

Carya spp.

- Witches' Broom

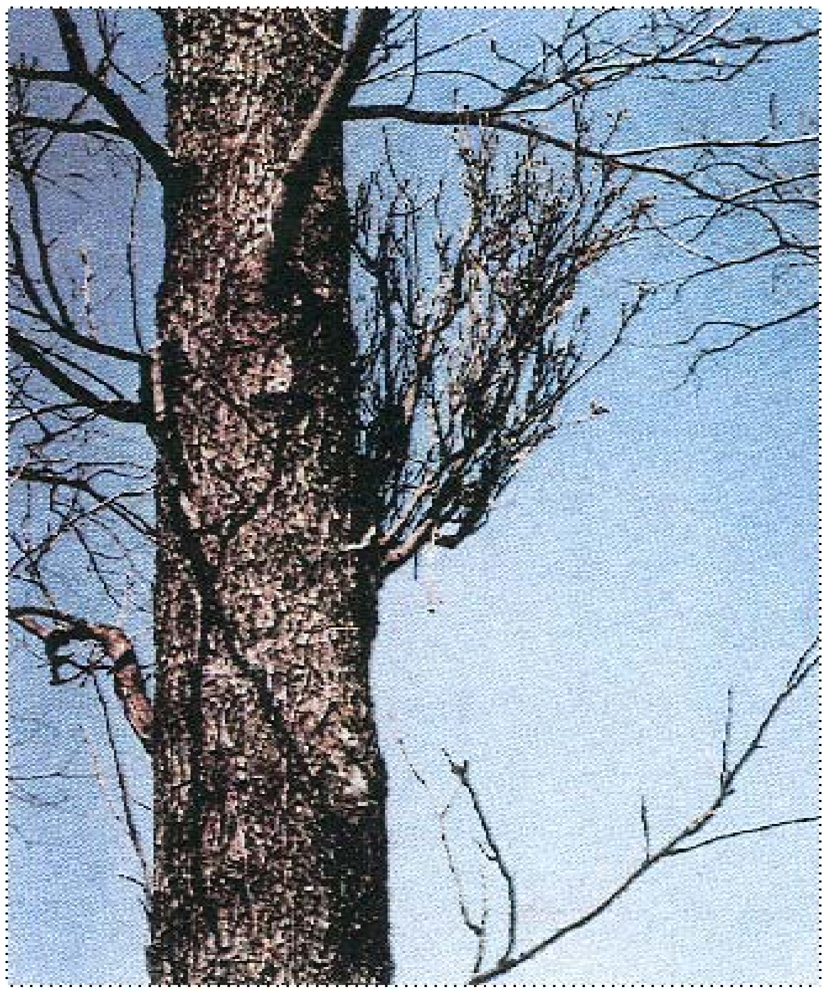


Figure 9-1 Symptoms of Witches' Broom on *Carya* spp.

Cedrus spp.

- *Fusarium fuliginosporum* Sibilia

Chaenomeles spp.

- Apple Chlorotic Leaf Spot Virus
- Apple Ring Spot Agent
- Quince Sooty Ringspot Agent
- Quince Stunt Agent—probably a complex disease caused by Quince Sooty Ringspot Agent and Apple Chlorotic Leaf Spot Virus

Crataegus wattina

- Unknown agent

Figure 9-2 Symptoms of chlorotic ring and line pattern caused by an unknown agent, on *Crataegus wattina* leaf

Crocosmia spp.

- *Uredo gladioli-buettneri* Bub.
- *Uromyces nyikensis* Syd. & P. Syd.

Cydonia spp.

- Quince Sooty Ringspot Agent

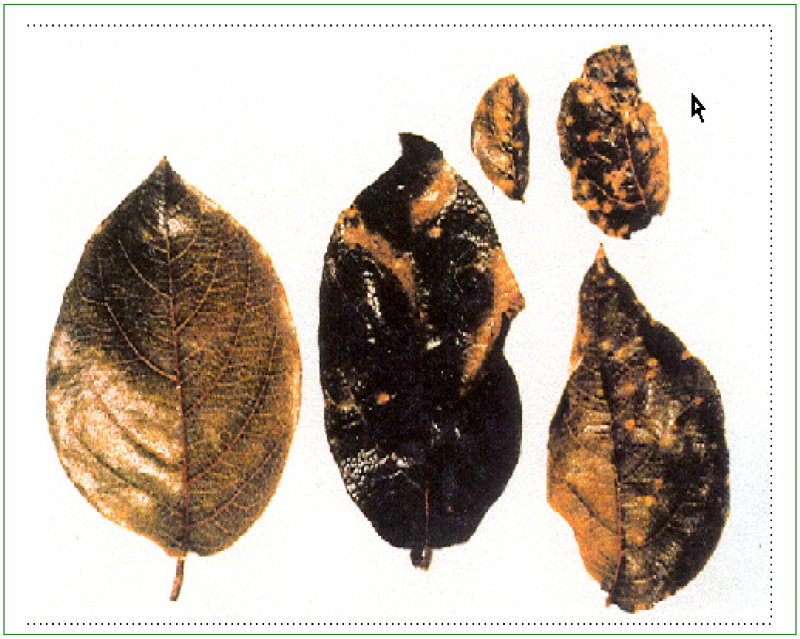


Figure 9-3 *Cydonia* spp. with symptoms of Quince Sooty Ringspot Agent on Quince C7/1 leaf; healthy leaf on left

- Quince Stunt Agent—probably a complex disease caused by Quince Sooty Ringspot Agent, Apple Chlorotic Leaf Spot Virus, and Quince Yellow Blotch Agent
- Quince Yellow Blotch Agent

Figure 9-4 ***Cydonia*** **spp. with yellow spotting and distortion of leaves caused by Quince Stunt Agent; healthy leaf on left**

Gladiolus spp.

- *Uredo gladioli-buettneri* Bub.
- *Uromyces nyikensis* Syd. & P. Syd.

Hibiscus spp.

- Cotton Anthocyanosis Agent
- Hibiscus Leaf Curl Agent

Humulus spp.

- Unknown virus

Figure 9-5 Symptom of streaking on leaves caused by virus on *Humulus* spp.

Jasminum spp.

- Chlorotic Ringspot Yellow Ring Mosaic Disease
- Sampaquita Yellow Ringspot Mosaic Disease

Juglans regia

- Cherry Leaf Roll Virus—a disease of concern on *Prunus* spp.

Figure 9-6 Chrome yellow mottle symptoms caused by Cherry Leaf Roll Virus on *Juglans regia* foliage

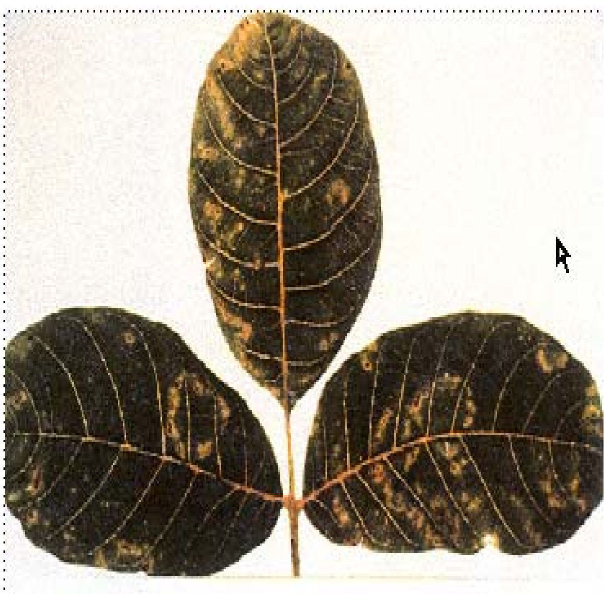


Figure 9-7 *Juglans regia* foliage showing chlorotic ring patterns, a symptom caused by Cherry Leaf Roll Virus

Larix spp.

- *Lachnellula willkommii* (Harteg) Dennis

Malus spp.

- Apple Ring Spot Agent
- Apple Chlorotic Leaf Spot Virus (= Plum Bark Split Strain of Apple Chlorotic Leaf Spot Virus)
- Apple Green Crinkle Agent
- Apple Chat Fruit Agent

Morus spp.

- Mulberry Dwarf Phytoplasma (Witches' Broom)

Philadelphus spp.

- Elm Mottle Virus

Picea spp.

- *Chrysomyxa ledi* (deBary) var. *rhododendri* (deBary) Savile—reported in the U.S. on Rhododendron

Pinus spp.

- *Cronartium ribicola* J.C. Fischer

Prunus spp.

- Arabis Mosaic Virus
- Cherry Leaf Roll Virus
- European Stone Fruit Yellows Phytoplasma
- Plum Bark Split Strain of Apple Chlorotic Leaf Spot Virus (= Apple Chlorotic Leaf Spot Virus)
- Raspberry Ringspot Virus
- Strawberry Latent Ringspot Virus
- Tomato Blackring Virus

Pseudolarix spp.

- *Lachnellula willkommii* (Harteg) Dennis

Pyrus spp.

- Apple Ring Spot Agent (RPP33:731)
- Pear Blister Canker Viroid (RPP39:596)
- Pear Bud Drop Agent (RPP41:466 and RPP45:753o)

Salix spp.

- *Erwinia salicis* (Day) Chester

Syringa spp.

- Elm Mottle Virus

Ulmus spp.

- Elm Mottle Virus

Watsonia spp.

- *Uredo gladioli-buettneri* Bub.
- *Uromyces nyikensis* Syd. & P. Syd.

Chapter 10

Disease and Pathogenic Organism Circulars

Contents

Circular 1: Diseases of *Abelmoschus* spp., *Althaea* spp., and *Hibiscus* spp.

Bhendi Yellow Vein-Mosaic Agent (Federal Quarantine Significant)

Revised Oct. 1987; restructured Jan. 1996

Synonyms

Ochrovena hibiscae Capoor, Hibiscus Yellow Vein-Mosaic Virus

Hosts

Althaea rosea L. Cav., *Abelmoschus esculentus* (L.) Moench. *A. moschantus* Medic., *Hibiscus moscheutos* L., *H. tetraphyllus* Roxb.

Distribution

Bangladesh, India, and Sri Lanka

Symptoms

Alcea rosea. There is faint vein-clearing of the young leaves followed by swelling of the veins at several points of the undersides of the leaves. The vein swelling gradually extends to nearly all veins which become thickened and gnarled as the leaf grows. The thickened veins are a deep green in color and appear opaque when seen against the light.

A description of the symptoms on shrubby forms of *Hibiscus* has **not** been found. They would probably be, in part, similar to those on okra (*Abelmoschus esculentus*) which follows.

A. esculentus

The first symptom is clearing of the small veins, and then of the larger ones, the ill-defined, yellowish-green to pale yellow areas later extending into the mesophyll. In severely diseased plants, the young leaves develop generalized chlorosis rather than a mosaic pattern. All growth produced after infection is stunted. The leaves are undersized and the petioles are short. Flowering is sparse and few fruits are formed. Most of the leaves on a diseased plant develop thickening of the veins on the lower side but no foliar growths or enations are formed.

Transmission

The white fly, *Bemisia tabaci* Genn. (*B. gossypiperda* Misra and Lamba); by grafting.

Figure 10-1 Example of virus-infected *Hibiscus* spp.; NOT Yellow-Vein Virus, but when such as this is found, it should be submitted for identification

References

1. Anonymous. 1942. Agricultural Research. N. Pathology Rep, Imp. Coun. Agric. Res. (New Delhi) 36.
2. Anonymous. 1943. Rep. Imp. Coun. Agric. Res. (New Delhi) 3-39.
3. Capoor, S.P. and P.M. Varma. 1950. Yellow vein-mosaic of Hibiscus esculentus L. Indian J. Agric. Sci. 20:217-30. (A summary can be found in Smith, K. 1957. Textbook of plant virus diseases. 2d ed.).
4. CFR 319.37§2.

Cotton Anthocyanosis Agent (Federal Quarantine Significant)

In progress.

Cotton Curliness on Hibiscus

Synonyms

Gossypium virus 2

Hosts

Gossypium hirsutum L., G. maritima, *G. vitifolium* Lam. and probably other *Gossypium* species., *Hibiscus cannabinus* L., and *Solanum dulcamara* L.

Vectors

Aphis gossypii, A. laburni, *Epitretranychus althaea*, and *Myzus persicae*

Distribution

Azerbaijan and Russia (Siberia)

Symptoms

The symptoms are similar to those of Cotton Leaf Curl, **except** in the following particulars:

- Enations are absent
- Hosts include S. dulcamara, a plant outside the family Malvaceae
- Reduced vein thickening
- Varieties showing resistance are **not** the same
- Vectors are different

References

1. Moskovetz, S.N. 1940. Plant virus diseases and their control. Transcript of the conference on plant virus diseases, Moscow-Leningrad Acad. Sci.; Nov. 4-7 (Moscow). Published in Abst. Rev. Appl. Mycol. 23:211-13.
2. Tarr, S.A.J. 1949. Leaf curl disease of cotton. London:Publisher 9.

Cotton Leaf Curl Agent (Federal Quarantine Significant)

Synonyms

Gossypium virus 1 and *Ruga gossypii* Holmes

Hosts

Abelmoschus esculentus (L.) Moench (*Hibiscus esculentus* L.), *Althaea rosea* L. Cav., (*Althaea rosea* Cav.), *Gossypium barbadense* L. (*G. vitifolium*), *G. barbadense* L. (*G. peruvianum* Cav. & *G. vitifolium* Lam.), *G. somalense* (Gürke) J. B. Hutch., *Hibiscus cannabinus* L., *H. sabdariffa* L. and *Malvaviscus arboreus* Cav. There is evidence that *Sida alba* L. and *S. cordifolia* L. may also be hosts.

Vectors

The white flies, *Bemisia tabaci* (Gennadius) (*B. gossypiperda* M. & L.) and *B. goldingi*.

Distribution

Africa

Symptoms

Gossypium. On *G. barbadense*, which includes Sea Island cotton and Egyptian cotton including Sakel, the disease is most severe and takes somewhat different forms than on *G. hirsutum*, commonly called American cotton.

Severely infected Sakel plants exhibit a characteristic twisted appearance, particularly in the petioles and fruiting branches. The plants tend to become abnormally tall with elongated and irregularly curved internodes. In extreme cases there may be practically no lateral growth on the upper parts, accompanied with bud shedding. Occasionally, however, severe infection gives rise to stunting rather than elongation of the plant. Curiously, this stunted expression of the disease is characteristic of its expression on certain varieties of American cotton. These show shortened internodes and a bunchy-top type of growth.

Sterility may be caused in infected plants as a result of suppression of the buds or their death soon after formation.

American cotton, is somewhat resistant to leaf curl and shows more variety in its symptoms. Some varieties develop a typical leaf curling with or without small enations, others a leaf mosaic, and yet others both types of symptoms.

The mosaic type of cotton leaf curl begins as a clearing of the veins. The chlorotic areas increase in size and frequently appear all over the leaf surface with a tendency to concentrate along the main veins, or they may be few and concentrated in certain areas of the leaf. They are most prominent on the upper surface and vary in color from pale green to light yellow to nearly white. In some instances, the whole leaf may appear yellow with puckered margins. The uneven distribution may result in asymmetrical growth and distortion.

Leaf curl and crinkle symptoms (on *G. barbadense*) first appear as isolated local thickenings of the veins, which are darker green or more opaque than normal veins. This symptom is best seen on the underside of the leaf viewed by transmitted light. As more and more of the veins are involved, they become thickened and appear gnarled and abnormally prominent. The margins of the leaf then curl upward or, less frequently, downward. In extreme cases enations develop on the veins on the lower surface of the leaf. These are cup-like or expanded pads of tissue that may attain a diameter up to one half of an inch.

The upper side of the leaf departs less from the norm. It may show a wrinkled appearance due to a slight sinking of the veins, and of course, it is affected by any curling of the margins. Similar symptoms may appear on the bracts and, in a reduced form, on the corolla.

Alcea rosea plants often have strongly thickened veins and curl considerably in the later stages.

Hibiscus esculentus plants have leaves showing conspicuous net-vein thickening with small inconspicuous enations. Curling may or may **not** be present.

The disease does little damage to *Malvaviscus arboreus* plants. A small amount of vein thickening and leaf curling occurs.

On *Sida* there may be a slight amount of thickening (presumably of the veins). Occasionally there is leaf curling.

Most of the information presented is taken from Tarr's monograph.

NOTICE

Laird and Dickson report the diesease, Leaf Crumple Virus, of cotton described in California is very similar to Cotton Leaf Curl Virus and may prove to be a strain of this disease.

References

1. Anson, R.R. 1934. Leaf curl disease of cotton in Fiji. Rept. 2nd Conf. Cotton Growing Problems. London:Empire Cotton Growing Corp. 195-96.
2. Bailey, M.A. 1934. Leaf curl disease of cotton in the Sudan. Empire Cot. Rev. 11:280.
3. Boughey, A.S. 1947. The causes of variation in the incidence of cotton leaf curl in the Sudan Gezira. Mycol. Pap. Mycol. Inst. 22:9.
4. Camas, J.S. 1935. Annual report of the director of plant industry from the fiscal year ending December 31, 1935. pp.76-80. (Rev. Appl. Mycol, 14:80).
5. Holmes, F.O. 1939. A handbook of phytopathogenic viruses. Minneapolis. MN:Burgee Publishing Co. 51; 52; 112-13.
6. Kirkpatrick, T.W. 1931. Further studies on leaf curl of cotton in the Sudan. Bull. Entom. Res. 33:323-63.
7. Laird, E.F. and R.C. Dickson. 1959. Insect transmission of the leaf-crumple virus of cotton. Phytopath. 49:324-27.

8. Moskovetz, S.N. 1940. Plant virus diseases and their control. Transcript of the conference on plant virus diseases, Moscow-Leningrad Acad. Sci.; Nov. 4-7 (Moscow). Published in Abst. Rev. Appl. Mycol. 23:211-13.
9. Russo, G. 1935. Cotton leaf curl or crinkle in Italian Somaliland. (trans.) Agricultura Colon. 29:78-95; 133-43; 188-99.
10. Tarr, S.A.J. 1949. Leaf curl disease of cotton. London:Publisher 9.
11. CFR 319.37§2.

Hibiscus Leaf Curl Agent on Hibiscus (Federal Quarantine Significant)

In progress.

Okra Mosaic Virus (Federal Quarantine Significant)

In progress.

Okra Yellow Leaf Curl Agent (Federal Quarantine Significant)

In progress.

Circular 2: Diseases of *Acacia* spp.

Acacia Rust (Federal Quarantine Significant)

August 2005

Causal organism

Uromycladium tepperianum (Sacc.) McAlpine

Synonyms

Uromyces tepperianus Sacc.

Hosts

Acacia spp., *Albizia* spp., and *Racosperma* spp.

Distribution

Australia, Java, New Caledonia, New Zealand, Papua New Guinea, and South Africa

Symptoms

Spermogonia. Spermogonia are minute, brownish becoming black, globose and 150 µm in diameter.

Telia. Telia develop on galls on leaves, branches, inflorescences and fruits. Infection causes swollen distorted galls up to 18 x 6 cm and witches' brooms of different shapes and sizes. The telia are cinnamon to chocolate brown in color and powdery in appearance.

Description

Spermatia. Spermatia are hyaline and ellipsoid.

Teliospores. Teliospores are composed of a cluster of three probasidial cells at the top of a single pedicel, depressed globose to globose. They are cinnamon brown in color, thickly vertically striate, margin is crenulate with the wall 2 to 3 µm at the apex. They are 14 to 22 µm high and 18 to 25 µm wide with one apical germ pore. The pedicel is hyaline, septate, and deciduous.

Notes

Aecia and uredinia are unknown.

References

Hernandex, J.R. Invasive fungi. *Uromycladium tepperianum*. Systematic Botany & Mycology Lab., ARS, USDA. http://nt.ars-grin.gov/sbmlweb/OnlineResources/FungiOnline.cfm (accessed October 12, 2005).

Circular 3: Diseases of *Acer* spp.

Maple (*Acer*) Leaf Spot (Federal Quarantine Significant)

Revised Sept. 1987; restructured Feb. 1996

Causal Organism

Xanthomonas acernea Owaga Burk

Synonym

Pseudomonas acernea Owaga

Hosts

Acer buergeranum (*Acer trifidum*) Hook & Arn. (and by inoculation 13 other *Acer* spp., & *Aesculus turbinata* Blume, and *Koelreuteria paniculata* Laxm)

Distribution

Japan

Symptoms

The leaves show irregular, water soaked, later pale gray or black spotting, and finally turn black and shrivel.

Characters

Non-spore forming rod, 0.5 to 1 x 2-.6 µm (.8 x.4),and aerobic, uniflagellate, gram and aniline positive (?), liquefying gelatin, clearing milk **not** coagulating it, producing some acid, no gas from six sugars and glycerine, reducing nitrates and forming Hs. Colonies first round smooth, white, margin entire turning citron yellow in 2 days at 32 °C. Thermal death point 59 °C.

References

Phytopath. Soc. Jap. VII, 2, 125-34, 4 fig. 1937. (Rev. Appl. Myc. 17:356, 1938).

Maple (*Acer*) Variegation Agent (Federal Quarantine Significant)

Hosts

Acer negundo L. *A. pseudoplatanus* L. *A. rufinerve* Sieb. & Zucc.

Distribution

Europe and Japan

A similar disease from Italy was reported by Goldanich (1954) affecting a number of Acer negundo trees. The leaf mottling varied from small dots to star-shaped spots that at times became confluent.

There is also a report from Czechoslovakia by Smolak that mosaic and leaf deformation of *Acer pseudoplatanus* and *A. negundo* is present in a park in Podebrady.

Symptoms

"Yellow variegation of the leaves" (Brierley 1944). "Characterized by mottled leaves, peppered with very small, more or less round, light green spots. On some plants the spots were smaller than 1.5 mm in diameter and so numerous that they were difficult to distinguish and give a chlorotic appearance to the plants. On other plants at least some of the spots attain approximately 3 mm in diameter." (Atanasoff 1935).

NOTICE
A disease of Acer rubrum caused by the Peach Rosette Virus was reported in Georgia in 1960 (Knight, K.G. P.D.R. 44:220). Thirty infected trees were noted in 1953 and by 1959, all had died. The trees were characterized by being stunted, having dense green foliage in the spring that turned reddish in the summer and yellowish before the tree's death.

Transmission

By budding and grafting

Properties

Not determined

References

1. Atanasoff, D. 1935. Old and new virus diseases of trees and shrubs. Phytopath. Zeitschr. 8(2):212; 197-223.
2. Brierley, P. 1944. Viruses described primarily on ornamental or miscellaneous plants. P.D.R. Suppl. 150:145; 150; 184-85; 414; 436-37; 437; 448-49; 475.
3. Goldanich, G. 1954. Unusual incidence of disease affecting economic plants in northern Italy. F.A.O. Pl. Prot. Bul. 3(1):4-7.
4. Smolak, J. 1949. Virove choroby a listy. Ochr. Rost. 22(5-6):173-203. (1951. Rev. Appl. Myc. 30(l):13-14).
5. CFR 319.37§2.

Xanthomonas acernea (Federal Quarantine Significant)

In progress.

Circular 4: Diseases of *Actinidia* spp.

Actinidia Rust (Federal Quarantine Significant)

October 2005

Causal Organism

Pucciniastrum actinidiae Hirats.f

Synonyms

None

Hosts
Actinidia spp.

Distribution
People's Republic of China, Japan, and Taiwan

Symptoms
Uredinia. are located on the lower leaf surface scattered or grouped on yellow or yellowish brown, discolored areas, sometimes thickly scattered over the whole surface of the leaf. They are round, minute, 0.08-0.2 mm across, located under the epidermis, and open when mature by a central pore. They are pale yellow in color.

Telia. are located on the lower surface of the leaf and are under the epidermis in dense clusters limited by the leaf veins. They are often spread over the whole leaf surface and are yellowish brown to brown in color.

Description
Urediniospores. are obovate, ellipsoid or oblong, 18 to 27 x 12 to 16 µm, walls 1.5 to 2 µm thick, minutely echinulate, and subhyaline, with germ pores 7 to 10 µm mostly scattered and obscure.

Teliospores. are intercellular, subglobose, oblong or cuneiform, laterally adherent. They are divided by 2 to 8 (mostly 4) vertical or oblique septa, 20 to 30 µm high, 17 to 18 µm across with walls uniformly thin, smooth, and pale yellow.

Notes
The spermagonial and aecial stages of this rust are unknown.

References
Hernandez, J.R. Invasive fungi. Pucciniastrum actinidiae. Systematic Botany & Mycology Lab., ARS. USDA (accessed October 13, 2005).

Pseudomonas syringae pv. *actinidiae* (bacterial canker of kiwifruit)

Causal Organism
Pseudomonas syringae pv. *actinidiae*

Synonyms
None

Hosts
Actinidia spp.

Distribution
Italy, China, Japan, Korea Republic

Symptoms
Disease characterized by cankers on kiwifruit

Distribution
In spring and early summer, the pathogen develops in expanding shoots and leaves. Small cankers develop on extending vines and leaves develop angular leaf spots surrounded by chlorotic haloes. In winter and early spring, extending cankers form on trunks and branches.

Transmission
Like all pathovars of *P. syringae*, *P. syringae* pv. *actinidiae* is present in infected plant material and, therefore, is usually introduced into new regions in nursery material. The pathogen can be dispersed in aerosols and can be carried between trees and adjacent orchards in wind-driven rain. As a wound-infecting pathogen, it can also be transmitted on orchard equipment such as pruning implements. Data is lacking on the epidemiology of the disease. It is suspected that it is spread by heavy rainfalls, strong winds, animals, and humans. Over long distances, trade of infected planting material can spread the disease. However, infected fruits **cannot** be totally excluded but seem very unlikely.

Notes
Propagative material of Actinidia spp., **except seeds**, are currently prohibited from Japan and Taiwan due to a rust (*Pucciniastrum actinidiae* Hiratusuka), and are under postentry quarantine from all other countries **except** Canada, Australia, and New Zealand.

References
1. EPPO RS 2009/215.
2. Serizawa et al., 1994.

Circular 5: Diseases of *Aesculus* spp.

(*Aesculus*) Horse Chestnut-Variegation Virus (Federal Quarantine Significant)

Revised and restructured Feb. 1996

Synonyms

None

Host

Aesculus hippocastanum Linn.

Distribution

Czech Republic, Germany, Romania, Slovakia, and United Kingdom

Symptoms

Yellow-leaf variegation House (5) wrote, "A tree of rich golden foliage which far surpassed anything of the sort I have seen for richness of effect and color." Other records of this variegation deal with its transmission.

Transmission

By grafting and budding, infection may occur following budding even when the bud fails to grow. In the experiment reported by House (5) the variegation passed upward in the stock, but **not** downward.

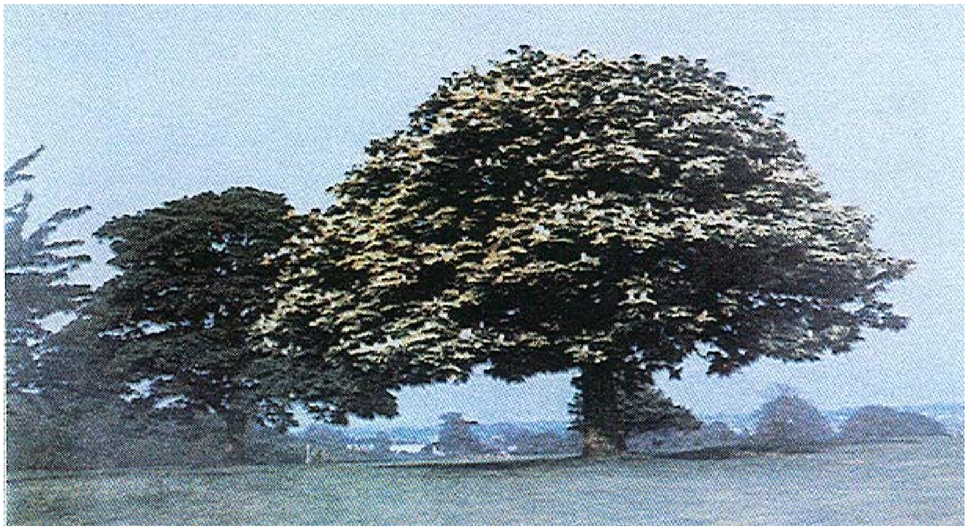


Figure 10-2 ***Aesculus hippocastanum*** **(horse chestnut) tree; virus causes a general yellow appearance**

Figure 10-3 ***Aesculus hippocastanum*** **(horse chestnut); leaf with banding pattern, a symptom of Yellow Oak Leaf Vein Virus**

References

1. Anonymous. 1881. Gardeners Chron. 16:507.
2. Atanasoff, D. 1935. Old and new virus diseases of trees and shrubs. Phytopath. Zeitschr. 8(2):212; 197-223.
3. Blattny, C. 1938. Note on some less known virus diseases (trans.) Ochr. Rost. 14:86-87. (Abstr. Rev. Appl. Myc. 17:543).

4. Brierley, P. 1944. Viruses described primarily on ornamental or miscellaneous plants. P.D.R. Suppl. 150:145; 150; 184-85; 414; 436-37; 437; 448-49; 475.
5. House, H. 1873. Transfer of variegation virus from scion to stock. Gardeners Chron. 1873:849.
6. Timpke, K. 1907. Panaschierung und transplantation. Jahr. Hamburg. Wiss. Anstalt 24:55-104.
7. CFR 319.37§2.

Circular 6: Diseases of *Anacardium* spp.

Xanthomonas campestris pv. mangiferaeindicae

June 2011

Causal Organism

Xanthomonas campestris pv. mangeiferaeindicae (Gammaproteobacteria: Xanthomonadales)

Synonyms

X. citri pv. mangiferaeindicae

Host

Mangifera indica (mango) and *Anacardium occidentale* (cashew)

Notes

Xanthomonas campestris pv. mangeiferaeindicae is an economically important pathogen of mango and *Anacardium occidentale* (cashew) and is reportable in the PEST ID database

Symptoms

Raised, angular, black lesions

Distribution

Africa, Asia, Australia, Brazil, Burkina Faso, and New Zealand

References

1. Pruvost, O, C Boyer, K. Vital, C Verniere, L Gagnevin, and I Somda. 2011. First report in Burkina Faso of *Xanthomonas citri* pv. mangiferaeindicae causing bacterial canker on *Mangiera indica*. Plant Disease 95(10):1

Circular 7: Diseases of *Berberis* spp., X *Mahoberberis* spp., and *Mahonia* spp.

Black Stem Rust (Federal Quarantine Significant)

Jan. 14, 1966; restructured Feb. 1996

Causal Organism

Puccinia graminis Pers.

The Black Stem Rust quarantine requires that nurseries that ship immune or resistant species of Berberis, Mahonia, or Mahoberberis into protected states **must** contain **no** susceptible species of these genera. The postentry detention of Berberis, Mahonia, and Mahoberberis is to facilitate determining whether introduced plants are true to name and immune or resistant to *P. graminis*.

We are concerned with enforcing postentry regulations on Black Stem Rust at the pycnial and aecial stages of the rust organism, which is its **only** expression on Berberis, Mahonia, and Mahoberberis. Discussion of the uredial and telial stages is, therefore, omitted. Descriptions of these may be found in any general text on plant diseases or the rust fungi.

Synonyms

(Listed by Arthur (1934); others may be found in Sydow *Lycoperdon poculiforme* Jacq., *L. lineare* Schr., *Aecidium berberidis* Pers., *Puccinia linearis* Rohl., *P. poculiformis* Wettst., *Diacoma poculiforme* Ktze.

Hosts

Pycnial and aecial stages are on *Berberis* spp. (**except** *B. thunbergii* and its varieties) and Mahonia.

Uredial and telial stages, according to Arthur (1934), are on at least 108 species of Gramineae including wheat, rye, and barley.

Distribution

Cosmopolitan following the distribution of its host plants

The pycnial and aecial stages are very rare in the southern states. Stakman et al. (1918) have shown that this is due to the lack of viable teliospores in the spring.

Symptoms

On Berberis, Mahonia, and Mahoberberis (After Heald with amendments from Arthur (1920))

Pycnial. The rust appears first on the upper surface of the leaf as a small, circular, yellowish spot that increases in size to 2 to 5 mm or slightly larger. The affected tissue is swollen, becomes marginated with a brighter yellow or reddish-purple color, and shows a central cluster of minute, honey-colored pustules on the upper surface (later turning brownish or nearly black) from which droplets of pycnial nectar ooze. The pustules (pycnia) are 90 to 110 µm in diameter and bear ostiolar filaments 30 to 60 µm long.

Aecial. (After Arthur (1920)) Aecidia on leaves, stems, and fruits, on the underside of the leaves in crowded, circular groups 1 to 6 mm across, on discolored, slightly thickened spots, cupulate or cylindric 0.2 to 0.3 mm in diameter, sometimes 2 mm long, but usually much shorter, wall colorless, the margin erose (toothed) slightly recurved; peridial cells oblong 16 to 23 x 19 to 26 µm, the outer wall thick 10 to 12 µm, smooth and transversely striate, the inner wall 2 to 4 µm thick, moderately verrucose, squarely abutted; aeciospores angular, globose or oblong 15 to 19 x 16 to 23 µm; wall colorless, 1 to 1.5 µm thick, considerably thicker above, 5 to 9 µm, finely and closely verrucose appearing smooth when wet.

Figure 10-4 *Puccinia graminis* on *Berberis* spp.; aecial stage on underside of leaf; may attack stems and fruit

References

1. Arthur, J.C. 1934. Manual of the rusts in the United States and Canada. Lafayette, IN:Purdue Research Foundation. 173; 270; 366-67.
2. Arthur, J.C. 1920. North American flora. 7:295.
3. Heald, F.D. 1933. Manual of plant diseases. New York:McGraw Hill 778.
4. Murrill, W.A. 1921. Notes. (On a paper read at the Chicago meetings of the Phytopath. Soc'y. Dec. 1920 by Stakman, E.C., R.S. Kirby, and A.F. Thiel) Mycologia 13:124.
5. Stakman, E.C. 1918. The black stem rust and the barberry. Yearbook separate #769, U.S. Dept Agr.
6. Sydow, P. and H. Sydow. 1904. Monographia Uredinearum seu specierum omnium ad hunc usque diem cognitarum descriptio et adumbratio systematica. Vol. I. Leipzig, Germany:Borntraeger Bros. 3:560-63.

Circular 8: Diseases of *Blighia* spp.

Circular 9: Diseases of *Bromeliaceae* spp.

Bromeliaceae

The restriction on Bromeliads applies **only** to Hawaii. It is a precautionary measure to protect Hawaii from the possible introduction of injurious pests of Bromeliads, particularly, Ananas sativus Schult., the pineapple. The latter is a major crop of the islands.

Circular 10: Diseases of *Brugmansia* spp. and *Datura* spp.

Colombian Datura Virus (Federal Quarantine Significant)

May 6, 1974; restructured Mar. 1996

Brugmansia and Datura are reservoirs for many viruses that attack plants belonging to the family Solanaceae. Some of the viruses may be latent, inciting no symptoms in Datura, while others will show a wide range of symptoms in leaves such as chlorosis, mosaic, twisting, vein-clearing, curling, rugosity, and necrosis. There may also be various other abnormalities as shoot proliferation,

stunted flowers, and stunted plants. Consequently, it might be difficult to associate a virus-like symptom with a virus common name without considerable testing.

Synonyms

None

Hosts

Brugmansia X candida Pers. (*D. candida*) & var. '*Culebra*', *B. sanguinea* (Ruiz & Pav.) D. Don (*D. Sanguinea*), and probably other species of arborescent Datura. Virus symptoms were experimentally produced on several indicator plants.

Distribution

Colombia

Symptoms

Kahn and Bartels (1968) report that Datura plants show vein-banding or chlorotic flecking on expanded leaves followed by mottling. Either the leaves become rugose and slightly distorted or the plants recover. When the plants recover, symptoms often reappear on new growth.

Description

The virus particle is a flexuous rod in the Potato virus Y group, around 720 mille microns.

Transmission

The virus is transmitted mechanically, i.e., plants touching one another or a person touching an infected plant and then a noninfected one.

Vector

The green peach aphid, *Myzus persicae* Sulzer.

Reference

1. Kahn, R.P. and R. Bartels, R. 1968. The Colombian Datura Virus—a new virus in the Potato Y group. Phytopath. 58:587-92.
2. CFR 319.37§2 (Jan. 2005).

Datura Shoestring Virus

May 6, 1974; restructured Mar. 1996

Brugmansia and Datura are reservoirs for many viruses that attack plants belonging to the family Solanaceae. Some of the viruses may be latent, inciting no symptoms in Datura, while others will show a wide range of symptoms in leaves such as chlorosis, mosaic, twisting, vein-clearing, curling, rugosity, and

necrosis. There may also be various other abnormalities as shoot proliferation, stunted flowers, and stunted plants. Consequently, it might be difficult to associate a virus-like symptom with a virus common name without considerable testing.

Synonyms

None

Hosts

Datura metel L., *Nicotiana tabacum* L. 'White Burley,' *N. glutinosa L.*, *N. rustica* L., and *Solanum jasminoides* Paxt.

Distribution

India

Symptoms

According to the report by Giri and Agrawal (1971), Datura leaves develop mosaic and severe blistering, while new leaves show distortion and deformation and are reduced to shoestring-like structures. The plants become severely stunted.

The symptoms on *Nicotiana glutinosa* are similar to Datura, but less severe. When the leaves of *N. tabacum* White Burley are inoculated with the virus, they develop local chlorotic lesions, that spread and become necrotic; and the plants die within 3 to 5 days. The inoculated leaves of *N. rustica* show veinal necrosis, mottle, and necrotic spots; the stems become necrotic and the leaves start falling and the plant collapses.

Transmission

Mechanically transmissible

References

Giri, L. and H.O. Agrawal. 1971. Datura shoestring virus, a new virus, isolated from Solanum jasminoides. Phytopath Z. 70(1):81-83.

Circular 11: Diseases of *Carica* spp.

Papaya (*Carica*) Leaf Reduction Virus

Revised July 1991; restructured Feb. 1996

Synonyms

None

Hosts
Carica papaya L.

Distribution
India

Symptoms
Singh (1969) reports that the first symptom of the disease is vein-clearing of the young leaves, followed by translucent areas developing and adjoining the veins, and by the lamina puckering. The raised areas are dark green in color. The subsequently developed leaves are deformed and reduced in size, and show pronounced distortion. In extreme cases, the entire leaf is reduced to a thread-like appearance at the top of the plant, which is characteristic of the disease. Infected plants are very much stunted and latex flow is reduced.

Older leaves on a diseased plant turn brown and fall off, and the entire stem becomes denuded, with **only** a small cluster of thread-like leaves at the top (Singh 1969).

Jensen (1949) and Singh (1969) refer to numerous papaya virus diseases from at least 15 countries, including, in the U.S., Florida, Hawaii, and Puerto Rico. Although some of the symptoms are like those of PLRB, these viruses appear to be distinct from the virus disease reported by Singh (1969).

Transmission
By sap

Vector
Myzus persicae (Sulzer)

References
1. Jensen, D.D. 1949. Papaya virus diseases with special reference to papaya ringspot. Phytopath. 39:191-211.
2. Singh, A.B. 1969. A new virus disease of Carica papaya in India. P.D.R. 53:267-69.

Circular 12: Diseases of *Cedrus* spp.

Douglas Fir Canker (Federal Quarantine Significant)
Revised June 1967; restructured Dec. 1995

Causal Organism

Phacidiopycnis pseudotsugae M. Wilson G. Hahn imp. stage *Phomopsis pseudotsugae* M. Wilson

Synonyms

Phacidiella coniferarum Hahn, *Phomopsis strobi* Syd., *Ligniella pinicola* Naum., *Discula pinicola* var. *mammosa* Lager., Lundberg and Melin

Hosts

Abies alba Mill., *A. balsamea* (L.) Mill., *A. procera* Rehd., *Cedrus atlantica* (Endl.) Manetti ex. Carriere, *C. deodara* (D. Don) G. Don., C. libani A. Richl, *Larix decidua* Mill., *L. keaempferi* (Lamb.) Carriere, (*L. leptolepis*) *L. sibirica* Ledeb., *Picea abies* (L.) Karst., *Pinus canariensis* Sweet ex K. Spreng., P. contorta Dougl., ex Loud., P. mugo Turr., *P. muricata* D. Don., *P. radiata* D. Don, *P. strobus* L., *P. sylvestris* L., *Pseudotsuga menziesii* (Mirb.) Franco, *P. menziesii* var. *glauca* Buchh. (*Sequoia gigantea*) and *Tsuga heterophylla* (Raf.) Sarg.

Distribution

Belgium, Czech Republic, Denmark, France, Germany, Great Britain, Ireland, Italy, Netherlands, New Zealand, Norway, Slovakia, Sweden, former U.S.S.R., and U.S. (Pacific northwest)

Wicker recently reported finding P. pseudotsugae cankers on Larix occidentalis in the intermountain region of the Pacific Northwest.

Symptoms

Three distinct forms of injury have been recorded:

Blighting of Terminal Shoots. Terminal shoots blighting has been recorded on seedlings and young plants. The tips of the trunk and the branches are the usual points of invasion and these die back for a length of 10 to 16 in. The needles on the invaded parts first turn brownish-yellow, then become dry and fall. In the tender young tissues, invasion is direct, no wound is necessary. The fungus invades the cortex and cambium, but **does not** penetrate the wood. With the death of the cambium, growth of the infected part ceases, and as a result, there is, at the margin of the diseased tissue, a strong thickening of the cork cells. (For an illustration of this effect *see* Phytopath 19:986). Pycnidia develop abundantly especially near the base of the diseased part. The seedlings may wither away at once, or adventitious buds may commence growth **only** to be killed in turn. The disease tends to be concentrated in certain parts of the seed bed or nursery.

Girdling of Branches and Trunks. Girdling occurs at some intermediate point on the branch or trunk. The girdle seldom reaches a length of 6 inches. Above and below, the tissues continue to grow for a time, and especially above, develop a characteristic swelling. In the end, the parts above the girdled area die from lack of nourishment.

Cankers of Larger Trunks and Branches. Cankers may develop on the larger trunks and branches. On hosts that develop cankers, **except** Larix, these cankers may attain a size 6 x 7.5 in., but on Larix they reach 6.5 x 13.5 in. in area. If the cankers are numerous and fairly large, the tree may be killed. Isolated cankers may be healed over as the fungus is **not** perennial in the bark.

The above symptoms are those shown by *Pseudotsuga*. Boudru states that other hosts react somewhat differently to the disease: *Abies* show trunks and branches girdling; *Tsuga* show young leader withering; *Cedrus* show trunks and branches girdling and terminal bud blighting; and on *Larix*, **only** cankers are found usually following wounds caused by pruning or rodents. *Larix* cankers often exude an abundance of resin.

Wilson (1930) states that it is improbable that *P. pseudotsugae* will be found on imported *Cedrus* as it so far has **not** been found on trees under 20 years old.

Description

Phacidiopycnis pseudotsugae. Apothecia frequently associated with pycnidial locules, innate in the stroma, developing under, but **not** concrete with, the periderm, one or more ascocarpic areas in a stromata that become erumpent and occur in colonies on discolored areas of the trunk or branch, ascocarps discoid, black, carbonous, 0.25 to 1.0 mm in diameter, at first covered by a pulverulent, olibaceous, stromatic layer that becomes loosened in irregular lobes above the sporulating tissue and finally torn away. At maturity, the darkened hymenium is fully exposed; asci cylindric-club shaped, elongate-stalked, thin-walled, 8-spored, 80 to 135 x 8 to 12 µm; ascospores irregularly uniseriate, continuous, occasionally one or two septate, hyaline, guttulate, elliptic or elliptic-fusiform, ends obtuse or subacute, 10 to 18.8 x 2.8 to 6 µm; producing bud spores in the ascus, these are short, elliptic, or rod-shaped, continuous, hyaline, 3.4-4.8 x 1.0-1.6 µm; paraphyses very numerous, filamentous, septate, tips slightly swollen, simple or occasional branched near the apex, outranking the asci, greenish in mass, tips uniting forming a pale olivaceous epithecium; hypothecium shallow; free unbranched hyphae within the dark, pseudo-parenchymatous excipulum producing microspores comparable in size and shape to those in the asci, spores formed singly from individual hyphal cells on fine isthmi.

Phomopsis pseudotsugae. Pycnidia black, globose, solitary or in groups of 2 or 3, the cavity is divided into more or less completely formed locules, and is from 100 to 500 µm in diameter. At maturity, they become erumpent through small cracks in the bark. The conidia are hyaline, elliptical, fusoid, obtuse at both ends and measure 5.5 to 8.5 x 2.5 to 4 µm. They are extruded in whitish, often coiled cirrhi (threads).

References

1. Boudru, M. 1948. La maladie du sapin douglas et d'autres coniferes, causee par Phomopsis pseudotsugae. Bul. Soc. for. Belg. 55:193-201.
2. Hahn, G.G. 1930. Species of Phomopsis occurring on conifers. Trans. Brit. Mycol. Soc. 15:32-93.
3. Hahn, G.G. 1957. A new species of Phacidiella causing the so-called Phomopsis disease of conifers. Mycol. 49:226-39.
4. Wicker, E.F. 1965. A Phomopsis canker or western larch. P.D.R. Suppl. 49(2):102-05.
5. Wilson, M. 1930. The Phomopsis disease of cedars. Gardeners Chron. 88:412-13.
6. Wilson, M. and G.G. Hahn. 1928. The identity of Phoma pitya Sacc., and P. abietina Hart. Trans. Brit. Mycol. Soc. 13:261-78.
7. Wilson, M. and G.G. Hahn. 1929. The history and distribution of Phomopsis pseudotsugae in Europe. Phytopath. 19:979-92.

Circular 13: Diseases of *Chrysanthemum* spp. (Dendranthema), *Leucanthemella serotina*, and *Nipponanthemum nipponicum*

Chrysanthemum White Rust (Federal Quarantine Significant)

Revised and restructured Feb. 1996

Causal Organism

Puccinia horiana P. Henn

Hosts

Chrysanthemum spp. (Dendranthema), Leucanthemella serotina (L.) Tzvelev, and Nipponantheum nipponicum (Franch. ex. Maxim) Matsuma

Distribution

Argentina, Brazil, Canary Islands, Chile, Colombia, Europe, Republic of South Africa, Uruguay, Venezuela, and all countries, territories, and possessions of countries located in part or entirely between 90° and 180° east longitude.

Symptoms

P. horiana produces large, white waxy spots on the undersurface of chrysanthemum leaves. It is much more dangerous to the chrysanthemum industry than *P. chrysanthemi*, the common chrysanthemum rust found in the United States, because it attacks new shoots early in the spring and the climatic factors favorable to the rapid spread of the organism are prevalent at this time of the year. (Kusano)

Description

The telial stage of the rust is the one encountered. Aecia and uredia are unknown. The disease spreads from plant to plant by means of sporidia produced by the teliospores.

According to Saccardo (1888) the teliospores are oblong-clavate with a broadened or obtuse to obtuse-pointed apex; base cuneate to applanate; slightly constricted at the septum, hyaline to yellowish, smooth. Spores range from 30 to 45 x 13 to 17 µm with a persistent, pale pedicel up to 40 µm long. Tai and Wei (1933), however, give teliospore sizes as 34 to 57 x 13 to 19 µm.

Figure 10-5 ***Puccinia chrysanthemi*** **on** ***Chrysanthemum*** **spp.; orange to brown spots on lower leaf surface; common disease; submit specimens**

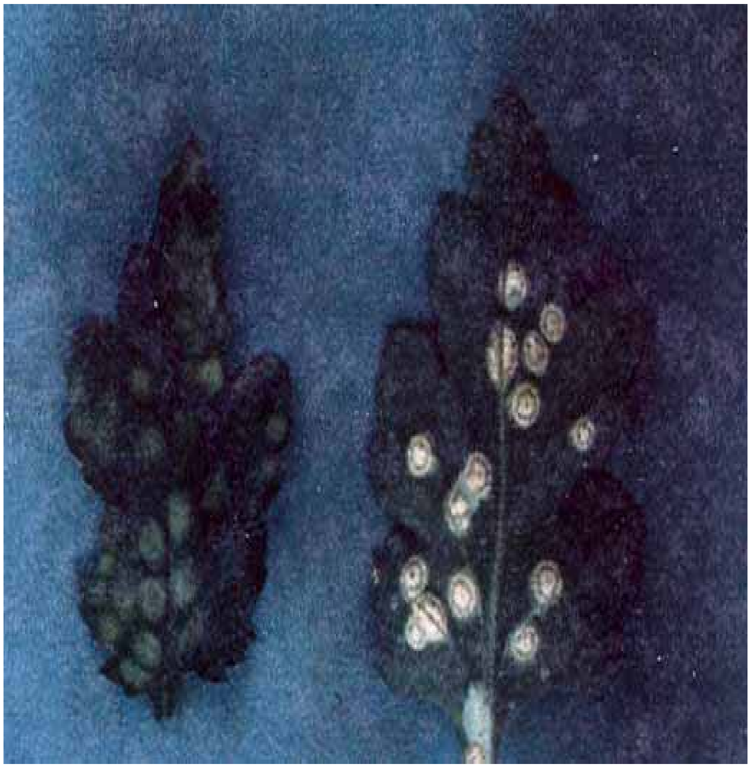


Figure 10-6 *Puccinia horiana* on *Chrysanthemum* spp.; white, waxy spots on lower surface of leaf

Table 10-1 may serve as an aid in distinguishing between the common chrysanthemum rust and chrysanthemum white rust.

Table 10-1 Comparison of Chyrsanthemum Rust and Chrysanthemum White Rust

Species:	***P. horiana*:**	***P. chrysanthemi*:**
Sori color	White to yellow	Chocolate brown
Uredospores	None	Commonly found
Teliospore size	34 to 57 x 13 to 19	34 to 57 x 18 to 28
NOTE:	For signs *see* Figure 10-6	For signs *see* Figure 10-5

NOTICE

P. horiana is relatively fast moving and, under ideal greenhouse conditions, should appear, if present, within a few weeks. Hence, we believe that greenhouse-grown cyrsanthemums regardless of the time of year, may be released after six months, if inspection at the end of that time reveals no sign of the rust. Greenhouse growing is required for postentry Chyrsanthemum growing (see Figure F-9).

P. horiana is favored by short day conditions and spreads rapidly under moist, overcrowded conditions. Investigations of the epidemiology of the disease in Japan showed that the optimum temperature for teliospore germination is between 13 °C to 22 °C. And the incubation period of the disease is 10 days.

References

1. Anonymous. 1965. A new threat to Chrysanthemum; white rust disease. N.Z. Pl. Gdns. 6(3):120-21.
2. Arthur, J.C. 1934. Manual of the rusts in the United States and Canada. Lafayette, IN:Purdue Research Foundation. 173; 270; 366-67.
3. Hiratsuka, N. 1957. Three species of Chrysanthemum rusts in Japan and its neighboring districts. Beih. 1:34-44.
4. Kusano, S. 1908. Biology of the chrysanthemum rust. Ann. Myc. 6:306-12.
5. Punithalingam, E. 1968. Puccinia horiana. in: CMI descriptions of pathogenic fungi & bacteria #176. CAB/CMI; Kew, Surrey, England.
6. Saccardo, P.A. 1888. Sylloge Fungorum. 1:470; 7:598; 7:739; 24:754; 25:713-14; 25:762. Ann Arbor, MI: V.W. Edwards (reprinted 1944).
7. Tai, F.L. and C.T. Wei. 1933. Notes on Chinese fungi. Sinensia 4(5):112-13.
8. CFR 319.37§2.

Circular 14: Diseases of *Corylus* spp.

Apple Proliferation Phytoplasma (Federal Quarantine Significant)

Synonym
Witches' Broom, Rozet (Rosette), Brooming

Time of Year to Inspect
Anytime while in leaf

Specific Symptoms

Hosts
Catharanthus roseus, *Corylus* spp., *Cynodon dactylon*, *Malus domestica*, *Prunus avium*, *P. armeniaca*, *P. domestica* (these Prunus species are possible hosts of Apple Proliferation—further testing to confirm is necessary), and *Vitis vinifera*

Plant. Buds set in August and September start growing in the fall. Infected branches leave trunk at a more acute angle than do healthy branches. For symptoms of this possible infection of the Apple Proliferation Phytoplasma on Prunus *see* Figure 10-7 and Figure 10-8.

Figure 10-7 The wilting of cherry (possibly caused by Apple Proliferation Phytoplasma)[1]

1 Photo reprinted with the permission of Dr. Natasa Mehle of the National Institute of Biology, Ljubljama, Slovenia.

Figure 10-8 Progresses to death of the tree (possibly caused by Apple Proliferation Phytoplasma)[1]

Leaf . Infected leaves are smaller, stipules enlarged. Color is usually yellowish-green or reddish. For the classic symptoms of enlarged stipules on *Malus* spp., *see* Figure 10-9 and Figure 10-10.

Figure 10-9 Enlarged stipules of an infected Malus plant[1]

Figure 10-10 Enlarged stipules of an infected *Malus* plant (left) compared to the regular-sized stipules on an uninfected plant (right)

Branch/Trunk. Clusters of bushy shoots. Infectious agent stimulates axillary buds on young shoots. Short internodes are produced. For this disease on Prunus, *see* Figure 10-11..

Figure 10-11 The necrosis on cross-section of branches of cherry (possibly caused by Apple Proliferation Phytoplasma)[1]

Figure 10-12 The necrosis on cross-section of trunk of cherry (possibly caused by Apple Proliferation Phytoplasma)[1]

Fruits. Reduced in size.

Flowers. Produced later in the season than on healthy plants. For this disease on Prunus flowers, *see* Figure 10-13.

Figure 10-13 Floral necrosis of cherry (possibly caused by Apple Proliferation Phytoplasma)[1]

Transmission

Grafting, root fusion, and the psyllids Cacopsylla melanoneura (Forster), & Cacopsylla costalis (Forster), and the leafhopper Fieberiella florii (Stal). Only the leafhopper occurs in North America.

Discussion

This disease reduces the production of marketable fruit by as much as 95% in Europe. Rosetting and shortening of internodes may also be caused by aphid or leaf hopper injury. The causal agent of this disease is **not** a virus, but a phytoplasma. Evidence of several different strains has been shown.

Distribution

Throughout Europe and in Turkey

References

1. Blumer, S., and R. Bovey. 1957. Uber den virosen besenwuchs an apfelbaumen. Phytopath. Z. 30(30):237-58.

2. Bovey, R. 1963. Virus diseases of apples and pears. CAB Tech. Com. 30:65-67.
3. Break, J. et al. 1972. Mycoplasmas in apple trees infected with the proliferation disease. Biol. Pl. 14(6):427-29.
4. Gianotti, J. et al. 1968. Micro-organisme de type mycoplasma dans les cellules liberiennes de Malus sylvestric L. atteint de la maladies de proliferations. C.R. Acad. Sc. Paris Ser. D 267:76-77.
5. Holtz, T. 2006. NPAG et Report Candidatus Phytoplasma mali: Apple Proliferation Phytoplasma (APP) Anaeroplasmatales/Anaeroplasmatacea. New Pest Advisory Group Report, Plant Epidemiology & Risk Analysis Lab., Ctr. for Plant Health Science & Techn. 50-55.
6. Kunze, L. 1976. The effect of different strains of apple proliferation on the growth and crop of infected trees. Mitt. Biol. Bundesanst. Land-Forstwirtsch. Berlin-Dahlem. 170.
7. Marcone, C., et al. 1996. Association of phytoplasmas with the decline of European hazel in southern Italy. Plant Pathology 45, 857-63.
8. McCrum, R.C. et al. 1960. Apple virus diseases. Joint bulletin as: ME Agr. Exp. Sta. Bul. 595, NH Agr. Exp. Sta. Tech. Bul. 101.
9. Mehle, N. et al. 2006. First report of Candidatus Phytoplasma mali in stone fruits (Prunus spp.). New Disease Reports. Jan. 2007, 3 pages.
10. Pena-Iglesias, A. 1975. Apple proliferation agent in Spain: graft transmission and detection of mycoplasma and rickettsia plasma-like organisms infected tissue. Act Hort. IXth Int. symp. on fruit tree virus diseases 44:193-97.
11. Seemuller, E. and B. Schneider. 2004. Candidatus Phytoplasma mali, Candidatus Phytoplasma pyri and Candidatus phytoplasma prunorum the causal agents of apple proliferation, pear decline, and European stone fruit yellows respectively. Int’l J. of Systematic & Evolu. Microb. 54:1217-26.
12. Seidle, V. and V. Komarkova. 1974. Studies on the natural spread of proliferation disease of apple. Phytopath. Z. 81:301-13.
13. Shfstopal, Z.A. 1975. Sadodstvo, Vinogradarstvo I, Vinodelie Moldavii 11:36-37.

Filbert (*Corylus*) Blight

Revised and restructured Feb. 1996

Causal Organism

Anisogramma anomala (Peck) E. Muller

Synonyms
Apioporthe anomala (Peck) Hoehn., *Cryptosporella anomala* (Peck) Sacc. *Diatrype anomala* Peck

Hosts
Corylus americana Marsh. (Hazelnut), Corylus avellana L. (Filbert)

Distribution
Eastern United States and Pacific Northwest

Symptoms
Humphrey's (1893) description of the disease appears to be the most complete. “It appears in the form of protuberances with elliptical bases that burst the bark and arise rather thickly from the affected portion of the branch, which is sunk below the surface of the healthy part.” A section shows that the protuberances (stroma) “contain numerous black flask-like structures, whose tips reach the surface of the protuberance.” “It is very noticeable that in the part of the branch occupied by the fungus, the inner bark (elsewhere a distinct band of tissue) is shrunken to a narrow black line between the wood and the bark. This reduction in the thickness of the inner bark explains at once why the surface of the affected parts is sunken below the rest of the surface and shows that the chief seat of vegetative activity of the fungus is in the rich growing conductive tissues” (Cambium).

According to Barss (1921) the ends of the branches are killed by girdling, the smaller twigs are attacked first and two or three years pass before the top is completely killed. He also states that the blight **does not** occur on *Corylus rostrata* Ait. or *C. californica Rose*.

Description
A specimen collected by G.P. Clinton, at Westerville, CT in 1902 was examined at the New York Botanical Gardens herbarium. This specimen showed large, oval stroma, 4 mm long by 3 mm wide and about 1 mm high. The stroma were wart-like and arranged more or less in two parallel rows usually on one side of the stem, but on one stem the two rows were nearly opposite. The torn epidermis stood up around the base of the stroma. The top or disc was roughened by the ostioles, (the exposed upper extremities of the beaks of the perithecia). The ostioles may have been scattered irregularly over the disc or been in an oval arrangement.

Pustules prominent, subrotund or elliptic, erumpent, 2 to 5 mm in diameter, wood subsunken, surrounded by a black layer, disc convex or slightly depressed, rough, brownish or blackish, powdery white at last; perithecia crowded, immersed in the stroma, now and then elongate; ostiole stalked and

loose, often radiately sulcate, black; asci short, thick, soon disappearing; spores hya-line, elliptic, continuous, 7 to 9 mu long.

References

1. Barss, H.P. 1921. Eastern filbert blight problem. Calif. Dept. Agr. Mo. Bull. 10:250-57; 1930. 19:489-90.
2. Farr, D.F. et al. 1989. Fungi on plants and plant products in the United States. St. Paul, MN:APS Press 564-65; 726; 979.
3. Halsted, B.D. 1892. A serious filbert disease. N.J. Agr. Exp. Rept. 13:287-89.
4. Humphrey, J.E. 1893. A hazel fungus. Mass. Agr. Exp. Sta. Ann. Rept. 10:242-43.
5. Saccardo, P.A. 1888. Sylloge Fungorum. 1:470; 7:598; 7:739; 24:754; 25:713-14; 25:762. Ann Arbor, MI: V.W. Edwards (reprinted 1944).
6. Slate, G.L. 1930. Filberts. New York (Geneva) Agr. Exp. Sta. Bul. 588.

Circular 15: Diseases of *Crataegus* spp.

Crataegus monogyna and *Mespilus germanica*

Crataegus monogyna Jacq. is a host of two or more Gymnosporangium rusts but Fischer failed in his experiments to inoculate it with G. fuscum. In this respect, it is similar to Mespilus germanica L. A negative result is indicative but **not** conclusive, therefore, **cannot** be dismissed. Gymnosporangium rusts are rather easily detected but their separation is usually work for a specialist. Rusts on these hosts should be referred to the Postentry Quarantine Unit.

Circular 16: Diseases of *Crocosmia* spp.

Gladiolus Rust (Federal Quarantine Significant)

August 2005

Causal Organism

Uromyces transversalis (Thum.) (G. Winter)

Synonyms

Uredo transversalis Thum., *Uromyces watsoniae* P. Syd & Syd

Hosts

Crocosmia spp., *Gladiolus* spp., *Tritonia* spp., and *Watsonia* spp.

Distribution

This rust is apparently indigenous to eastern and southern Africa. It has also been reported from Morocco, southern Europe (questionably from France and Spain, possibly established in Italy, Malta and Portugal) South America (Argentina and Brazil), Martinique, Australia, and New Zealand. It was recently intercepted from Mexico.

Symptoms

Uredinia are round to oblong or irregular and transverse on the leaf surface. They may be found on the upper or lower leaf surface. The uredinia are 0.5 to 1.5 mm long and 0.5 to 2 mm broad. At first they are covered by the blistered epidermis that splits. They are yellowish-orange in color.

Telia. Telia are minute, black and remain covered by the epidermis and grouped (small to larger groups). The groups may be scattered, in cavities on the leaf surface and are separated by golden-brown, palisade-like paraphyses (sterile upward growing, basally attached hyphal elements). The paraphyses are 50 to 112.5 µm in diameter and 55 to 75 µm deep with spores in 3 to 4 closely packed rows.

Description

Urediniospores are variable in form and size. They may be ovate, ellipsoidal or oblong and are 14 to 26 x 13 to 25 µm. The cell wall is hyaline and typically 1.5 to 2 µm thick and closely and minutely verruculose. There are germ pores, but they are obscure and 6 to 8 in number and scattered.

Teliospores. Teliospores are ovate, ellipsoid or pyriform, and less frequently globose often irregular or angular through mutual pressure. They are light brown, darker (often chestnut brown) near the apex. The apex of the teliospores is rounded, truncate or broadly conical, base usually attenuate, less frequently rounded. They are (17.5 to) 20 to 25 (to 34) x (14 to) 15 to 17.5 (to 21) µm with the cell wall smooth, usually 2 µm thick, 4 to 6 (to 8) µm at the apex. The pedicel is semi-persistent, hyaline, or tinted at the apex and is 45 µm long and 2 µm thick.


Source: USDA–ARS

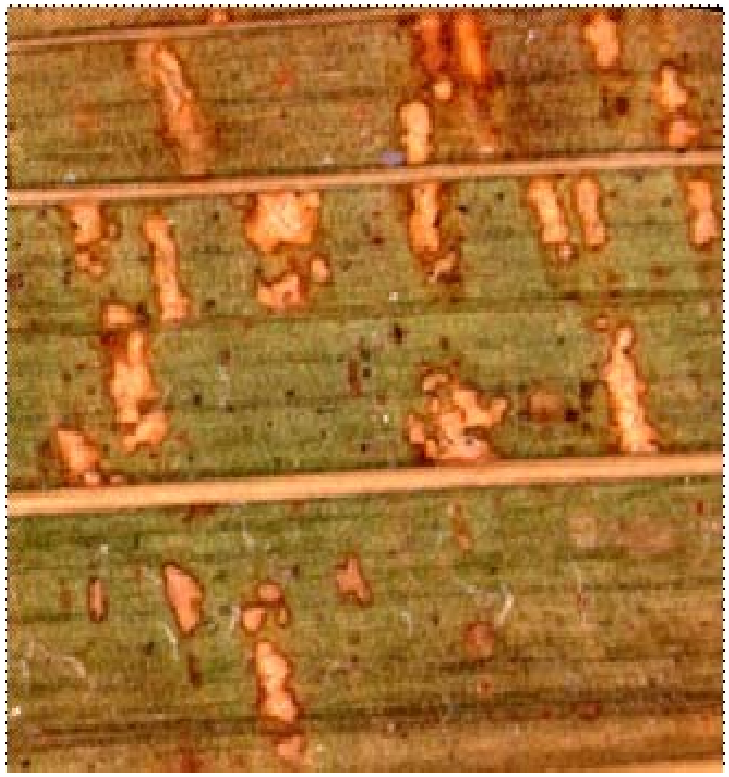
Figure 10-14 Uredinia of *Uromyces transversalis*

Source: USDA–ARS

Figure 10-15 ***Uredinia*** **(across the width of the leaf) and telium (dark) of** ***Uromyces transversalis***

Source: USDA–ARS

Figure 10-16 Uredinia, erumpent, across the width of the leaf of *Uromyces transversalis*



Source: USDA–ARS

Figure 10-17 Uredinia (across the width of the leaf) of *Uromyces transversalis*

Source: USDA–ARS

Figure 10-18 Uredinia (yellowish) and telia (dark) of *Uromyces transversalis*

Notes

Spermogonia and aecia are unknown.

References

Hernandez, J.R. Invasive fungi. *Uromyces transversalis*. Systematic Botany & Mycology Lab., ARS, USDA (accessed August 24, 2005).

Uredo gladioli-buettneri (Federal Quarantine Significant)

In progress.

Circular 17: Diseases of *Dianthus* spp.

Carnation Wilt

Causal Organism

Phialophora cinerescens (Wollenw.) Van Beyma

Synonym

Verticillium cinerescens Wollenw.

Hosts

Dianthus spp. *Dianthus chinensis* L. (Chinese Pink), and *D. barbatus* L (Sweet William) are said to be very susceptible, *D. caryophyllus* L. (Carnation) highly resistant, and *D. deltoides* L. immune. *D. nardiformis*, *D. balbisii*, *D. (hyssopifolius) monspessulanus*, and *D. cinitus* also reported as hosts (RAM 43:760). Hosts in other genera include: *Silene latifilia* spp. alba (Mill.) Greuter and Burdet (*Melandrium album*) (RAM 38:290) and *Saponaria officinalis* L., *Petrocoptis grandifloria*, A. Braun ex Endl., *Viscaria sartorii* and Silene compacta Fisch. Ex Hornem. (RAM 43:760).

Distribution

Bulgaria (RPP 61:627); Denmark (RAM 38:389); France (RAM 38:368); Italy (RAM 40:226); Poland - one farm (RAM 45:2860); Netherlands (RAM 38:118); Romania (RPP 63:165); UK (RAM 38:480, 42:26); (RAM 43:2360); Former USSR (RPP 58:3320); and Germany (RAM 41:230).

NOTICE
Review of Applied Mycology (RAM); Review of Plant Pathology (RPP).

Symptoms

The leaves of infected plants are wilted, wrinkled and chlorotic. Cross-sections of the stem show brown discoloration of the vascular ring. The foregoing symptoms are similar to those caused by *Fusarium dianthi* Prill. and Del., but the leaf chlorosis caused by *Phialophora cinerescens* is less marked and there is a tendency for localization of the vascular discoloration in the tracheids and vessels. No extensive rotting of the pith and cortex is found. The stems may develop kinks at the nodes and the internodes may be somewhat shortened.

As there are other wilts of Dianthus caused by several species of Fusarium, a key devised by Wickens (1935) for separating those diseases follows.

Key to Wilt and Desiccation of Leaves and Shoots. 1.Vascular discoloration throughout the collar and wilting shoots—Go to 2.

No extensive vascular discoloration—Go to 3.

2. Vascular discoloration followed by a dry “sheddy” rot of affected wood and cortex—Fusarium wilt (*F. dianthi*)

No later development of tissue rotting—Phialophora wilt (P. cinerescens)

3. Indiscriminate rotting of the collar stem rot—(*Fusarium* spp., *F. culmorum*, *F. herbarum*)

   Not as above—other diseases or disorders
   Note—Invasion is through the roots from the soil. In experiments, inoculated plants remained apparently healthy for as long as 13 weeks.

References

1. White, H.L. 1936. On Verticillium wilt of the perpetual flowering carnation. J. Pomol. 14: 214-26.
2. Wickens, G.M. 1935. Wilt and stem rot of the perpetual flowering carnation. Ann. Appl. Biol. 22:630-883.

Dianthus Virus Diseases

Hosts

Dianthus caryophyllus L. (Carnation) and *D. barbatus* L. (Sweet William)

Etched Ring. Whitish etched necrotic flecks and rings, usually oval or dumbbell shaped, resembling ringspot. May be small irregular rings and streaks on flowers and axillary stems. Some varieties show conspicuous necrotic blotches of irregular shape, usually pale fawn in color with darker brown maroon edges on the leaves; sphere shaped; world wide

Figure 10-19 Carnation Etched Ring Virus on *Dianthus* spp.; atypical; note white lines in first and third leaves

Figure 10-20 Carnation Etched Ring Virus on *Dianthus* spp.; note typical symptoms showing etched rings in first leaf

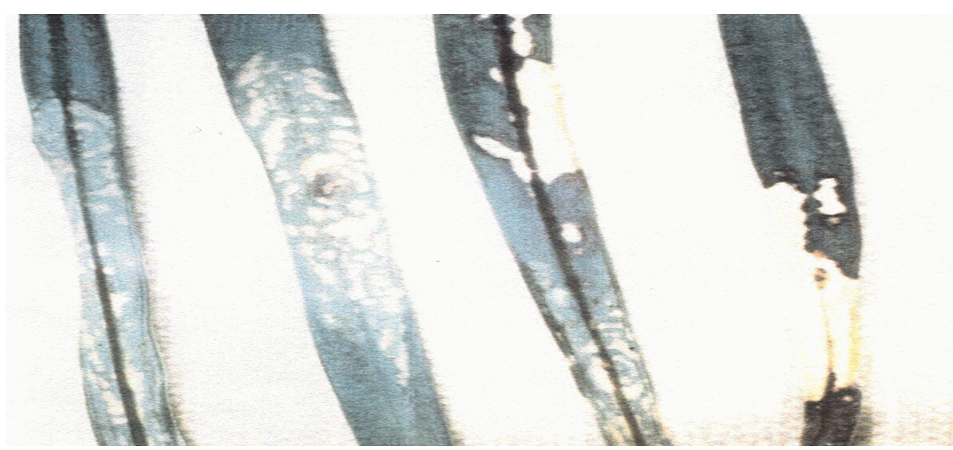


Figure 10-21 Carnation Etched Ring Virus on *Dianthus* spp.; severe symptoms

Latent. No symptoms

Mosaic. Yellowish to gray brown leaf mottle, coalescence of several spots may be followed by necrosis of centers; plants are stunted and flowers may be striped or spotted.

Mottle. Mild mottling or no symptoms; may cause flower breaking in some varieties; sphere shaped; world wide.

Necrotic Fleck. 1400 to 1700 nm long; in Japan 1973.

Ringspot. Gray rings or irregular chlorotic spots, may be several concentric rings, streaking, reddening, and leaf distortion; sphere shaped; world wide.

Streak. Yellowish or reddish spots and streaks, parallel to veins; lower leaves may be heavily spotted and turn yellow.

Vein Mottle. Vein clearing in young leaves that may develop into chlorotic spots that follow veins; 790 nm long; world wide.

Yellows. Caused by a combination of streak and mosaic viruses; affected plants show both the mottling and spotting characteristics of the two viruses.

NOTICE

There is still some confusion about the identity, nomenclature, distribution, and symptomatology of these viruses. Combinations of viruses are commonly found in a single plant. The symptoms produced in such cases may **not** be clear cut. Carnation Ringspot Virus, Vein Mottle Virus, and Mottle Virus (event when latent) significantly reduce the yield and quality of flowers in the variety “William Sim.”

Available evidence indicates that some of these viruses, especially Etched Ring and Ringspot, are **not** widely distributed in the United States.

Most carnation viruses are sap transmissible and indexing techniques can make positive determination. This procedure, however, is **not** practical for postentry quarantine control.

References

1. Brierly, P. and F.F. Smith. 1957. Carnation viruses in the United States. Phytopath. 47(12):714-21.
2. Chamberlain, E.E. 1954. Plant virus diseases in New Zealand. Bul. 108. N.Z. Dept. Sci. and Industrial Res. 196-98.
3. Hakkaart, F.A. 1964. Description of symptoms and assessment of loss caused by some viruses in the carnation cultivar 'William Sim'. Neth. J. Plant Path. 70:53-60.

4. Hollings, M. 1962. Virology. Ann. Rept. Glasshouse Crops Res. Inst. 70-73.
5. Hollings, M. and O.M. Stone. 1961. Carnation etched ring: a preliminary report on an undescribed disease. Ann. Rept. Glasshouse Crops Res. Inst. 9444-95.
6. Smith, K.M. 1972. A textbook of plant virus diseases. New York:Academic Press. 25-27; 121-27; 149.

Leaf Rot of Carnation

Causal Organism
Heteropatella valtellinensis (Trav.) Wr.

Synonyms
Excipulina valtellinensis Trav., *Heteropatella dianthi* Budd & Wakef., and *Pseudodiscosia dianthi* Host & Laub.

Hosts
Dianthus caryophyllus L. (carnation)

Distribution
England, The Netherlands, Germany, Italy, Canada (British Columbia), and U.S.A (Washington)

Symptoms
Both surfaces of the leaves show large discolored patches that are soft and brown, or when dry, bright whitish-gray. The patches occur either as transverse bands or extended over the whole terminal part of the leaf, which as a result, becomes withered and cracked. Similarly discolored spots occur frequently on the stems, flower stalks, bracts, and sepals. Very small, round, rather dark grey spots are present in large numbers on both sides of the diseased part of the leaves. These spots are, for the most part, so indistinct as to be hardly recognizable. They are more easily seen if the leaf is held up to the light. They then appear as rather closely grouped circular areas, transparent, and like a spot of grease lying in the leaf, nearly one-half a millimeter in diameter with a more or less distinct point in the middle. This point is frequently covered by a tiny, waxy, whitish or yellowish-gray, wart-shaped or conical granule. When the diseased leaves are placed in a moist chamber, this granule, viewed with a hand lens, is often seen to resemble a longer or shorter tendril-like string of sausages.

Due to the rotting leaves, affected plants have an unhealthy appearance, but healthy leaves are often present scattered about among the decaying ones. The decaying leaves may appear soft and wet, or dry and firm depending on the atmospheric humidity. The infected leaves often crack near the base and may

fall off if the plant is lifted or shaken. The youngest leaves, while still clasped together, may present a pure white color for a considerable length down the leaf. This white color later changes to gray.

References

Salmon, E.S. and W.M. Ware. 1927. Gardeners Chronicle. 81:196.

Circular 18:Diseases of *Dimocarpus* spp.

Witches' Broom

Feb. 8, 1974; restructured Mar. 1996

Synonyms

None

Hosts

Dimocarpus longan Lour. (Longan), *Litchi chinensis* Sonn. (Lychee), (it is possible to transmit the agent to *L. chinensis* by grafting).

Distribution

China, Hong Kong

Symptoms

According to a report by Li (1955), the disease was first recognized in 1948 in Southeast China. As far as is known, this is the **only** disease reported on longan fruit trees growing in China and Hong Kong. The longan is cultivated for its fruit; and the wood is a valuable source of timber.

Infected trees observed by Li (1955) usually showed narrow and crinkled leaves with different degrees of yellowing along the veins. These symptoms are especially evident on young leaves. On young twigs, malformed leaves usually fall off prematurely while buds at the basal portion of the same twig soon develop into shoots with very short internodes. These again carry deformed thread-like leaves that also fall of prematurely, leaving a bunch of leafless twigs resembling a witches' broom.

Flowering panicles show a crowded condition of the flowers, which are deformed and soon drop off. The flowerless panicles then resemble a broom. These conditions seriously reduce the production of fruit. So and Zee (1972) report (from Hong Kong) that infected trees show leaves with symptoms of malformation and vein clearing, and accompanied by systemic necrosis and slight blisters. On the new growth, young leaves of diseased trees are smaller than healthy ones, duller in color, and with rolled margins. Although the virus

appears to be systemic, So and Zee (1972) found that **not** all branches of an infected tree will show symptoms of the disease.

Transmission
The agent may be transmitted by grafting and by seed from diseased trees.

Vector
The Lychee stink bug is suspected as a vector in the transmission of the virus.

References
1. Li, L.Y. 1955. A virus disease of longan, Euphoria longana, in southeast Asia. Acta Phytopathologica Sinica 1:211-16 (Chinese, England summ.).
2. So, V. and S.Y. Zee. 1972. A new virus of longan (Euphoria longana Lam.) in Hong Kong. PANS 18(3):283-85.

Circular 19: Diseases of *Diospyros* spp.

Circular Leaf Spot of Oriental or Japanese Persimmon

Synonyms
None

Causal organism
Myocosphaerella nawae

Hosts
Diospyros kaki (Japanese persimmon)

Distribution
China, Japan, Korea, Spain

Symptoms
Fungus is characterized by circular necrotic spots on the leaves and defoliation. Early fruit maturation and premature abscission are associated with early symptom development in the trees. Fungus is consistently isolated from the margins of leaf lesions.

References
Plant Disease, March 2010, Vol. 94, No. 3, Pg. 374.

Circular 20: Diseases of *Eucalyptus* spp.

Pestalotia disseminata (Federal Quarantine Significant) and Leaf Chlorosis Virus

Two diseases of Eucalyptus are Leaf Chlorosis Virus and *Pestalotia disseminata* Thum.

P. disseminata is said to cause leaf dropping or blight of infected trees. Any virus disease or any spotting or blight of Eucalyptus leaves with which a Pestalotia is associated should be investigated and called to the attention of the Postentry Quarantine Unit.

Circular 21: Diseases of *Euonymus* spp.

Euonymus Mosaic (Euonymus-Variegation) Agent (Federal Quarantine Significant)

Revised and restructured Mar. 1996

Causal Organism

Marmor euonymi Holmes

Synonyms

Euonymus infectious chlorosis (virus) Baur

Hosts

Euonymus japonicus Thunb., *E. fortunei* (Turez.) Hand.-Mazz. (*E. radicans* Sieb.)

Distribution

Europe and Japan

Symptoms

According to Baur (1908), infected leaves show a rather wide yellow border and the center is mottled green or greenish-yellow; also, young leaves show a yellow venation rather distinctly. As the leaves become older, the discoloration can **only** be detected by transmitted light. The pattern is like that of the variegated *Euonymus japonica* var. *aureo-marginata* Hort.

Brierley (1944) gives the following description attributing it to Rischkow (1927). “Chlorosis appears as pale streaks, continuous or interrupted, along the veins of young leaves. These mask with further growth of leaf, but pale flecks appear in the mesophyll which persist in fully-expanded leaves.

NOTICE

Noninfectious variegated varieties of Euonymus also occur. These show a white or yellow margin surrounding the normal green central portion of the leaf. The distinguishing feature of the infectious variegation is the mottling of the central green area, which is best seen by transmitted light.

Figure 10-22 Euonymus Mosaic

References

1. Baur, E. 1908. Uber eine infektiose Chlorose von Euonymus japonicus. Bericht. d. Deutsch. Bot. Gesellsch. 26a:711-13.

2. Brierley, P. 1944. Viruses described primarily on ornamental or miscellaneous plants. P.D.R. Suppl. 150:145; 150; 184-85; 414; 436-37; 437; 448-49; 475.
3. Holmes, F.O. 1939. A handbook of phytopathogenic viruses. Minneapolis. MN:Burgee Publishing Co. 51; 52; 112-13.
4. Rischkow, W. 1927. Neue Daten uber geaderte Panaschierung bei Euonymus japonicus und E. radicans. Biol. Zentralbl.

Circular 22: Diseases of *Fraxinus* spp.

Ash Canker Disease (Federal Quarantine Significant)

Revised and restructured Mar. 1996

Causal Organism

Pseudomonas savastanoi var. *fraxini* (Brown) Dowson

Synonyms

Pseudomonas fraxini (Brown) Skor., *Bacterium savastanoi* var. *fraxini* N.A. Brown

Hosts

Fraxinus spp. including *F. ornus* L., *F. velutina* Torr., *F. excelsior* L., and *F. americana* L. (A. Alba)

Distribution

Europe

Symptoms

The following description is a slightly condensed version of that given by Skoric (1938): At first, very young cankers show **only** one or two vertical splits in the periderm and the cell layers below it, but later, cross splits appear and the cankers become open showing the browned and blackened tissues. In later stages, the bark is more and more broken down and blackened and the wood beneath becomes blackish or browned with many cracks or splits. At the same time, the bark at the margin shows intensive growth and hypertrophy, and the annual rings in the vicinity of the canker are enlarged.

The cankers are of two types with occasional intermediate forms. In Yugoslavia, the sunken or depressed type is the most common. The verrucose type described by Van Vliet (1931) occurs but is less prevalent. At a longer or

shorter distance from the old canker there are swellings, usually a few millimeters or at most one centimeter in width, covered by undamaged bark. Beneath the bark the tissue is diseased and discolored.

In the early stages of the disease, young cankers are usually found near leaf scars, but some also develop between the internodes. They often form in a vertical line, which is thought to be due to distribution by rain water running down the trunk or branch. Small cankers of the sunken type develop in one or two years, but large cankers are found **only** after from ten to thirty years. When infection occurs in young trees dwarfing results, the tree **does not** grow beyond one or two meters tall.

According to Riggenbach, the first symptom of the bacterial infection is noted as a reddish discoloration of the cortex followed by the development of pale, elliptical spots on the stems and branches. The expansion of the spots is accompanied by an elevation of the center and a rupturing of the surface into longitudinal fissures.

Brown (1932) states, “The cankers of the European ash vary in size from small cracks with thickened margins to irregular fluted outgrowths several inches in length and width, with cavities extending into the wood. They increase in size and number from year to year on both trunk and branches.” Cankers are also said to occur occasionally on the leaves and petioles.

In another description taken from a paper by Van Vliet (1931), some anatomical details **not** found in those above are included. The cankers are of three forms: verrucose; depressed; and intermediate between the first two types. The verrucose cankers assume the form of large or small protuberances the entire surface of which appears covered with warts. The depressed cankers are holes in the wood surrounded by jagged edges of bark; they are of varying depth, mostly circular, but occasionally much elongated. The transitional forms include on the one hand, depressed cankers with verrucose edges, and on the other, sunken areas with a marked tendency to healing over.

In the verrucose cankers the diseased bark is composed chiefly of brown canker tissue, within which **only** a narrow strip is healthy. In those of the depressed type the canker tissue is restricted to the inner cortical layers on the edge of the canker. The diseased tissue contains many cork layers running approximately parallel to the cambium and often visible to the naked eye as pale lines. Between the cork layers are cavities filled with bacterial slime. Fungus hyphae and masses of needle crystals may also be present in the cavities. The much-swollen wood below the proliferated cortex is brown and dull, the annual rings are separated from one another by a brown line.

References

1. Brown, N.A. 1932. Canker of ash trees produced by a variety of the olive-tubercle organism, Bacterium savastanoi. J. Agr. Res. 44:701-21.
2. D'Oliveira, M. 1939. Inoculacoes experimentais com o Bacterium savastanoi var. fraxini N.A. Brown. Agron. Lusit. 1(50):88-102.
3. Riggenbach, A. 1956. A study of ash canker. Phytopath. Z., 27(1):1-40. (1957. Rev. Appl. Myc. 36:144).
4. Skoric, V. 1938. The ash canker disease and its causal organism, Pseudomonas fraxini (Brown) Skor. Ann. Exp. for., Zagreb. 6:66-97.
5. Tubeuf, C.V. 1936. Tuberkulose, krebs, und rindengring der eschen (fraxinus). Arten und die sie veranlassenden bacterien, nektriapilze und borkenfafer. Z. Pflkrankh. 46:449-83.
6. Van Vliet, J.I. 1931. Ash cankers and their structure. thesis, Univ. of Utrecht. Baarn, Hollandia Drukkerij 73.
7. Vuillemin, P. Cancer et tumeurs vegetales. Nancy Soc. Sci. Bull. Seances 3(1):37-62.
8. CFR 319.37§2.

Fraxinus Other Virus Reports

Plakidas reported an apparently lethal virus causing a Witches’ Broom of *Fraxinus berlandieri* in Louisiana. Cuttings from the infected tree failed to root, but the virus was transmitted by inarching. The resulting plants formed abnormal leaves and soon died. The original infected tree was destroyed.

Novak reports from Czechoslovakia that virus symptoms on ash were transmitted to privet.

Rosette of *Fraxinus americana* was reported from the Botanical Gardens in Minsk, Byelorussia by Kuprevicz (1947). Although transmission tests were **not** indicated, symptoms consisted of apical rosetting, stunting, under-developed stems, deformed leaflets with down-curled margins, and small, necrotic spots. In addition, the root system was poorly developed.

Two viruses of ash have been reported by Ciferri et al. (1961) from Italy. The first, transmissible by chip-budding is named “Necrotic Leaf Curl.” Symptoms consist of vein clearing followed by necrosis, chlorotic spots of the leaf blade that become necrotic, leaf malformations, and aborted Witches’ Brooms. The second disease, named “chlorotic marbling,” is characterized as a chlorotic marbling of the leaves, especially the upper surfaces. Infection is most severe on apical leaflets resulting in some deformations.

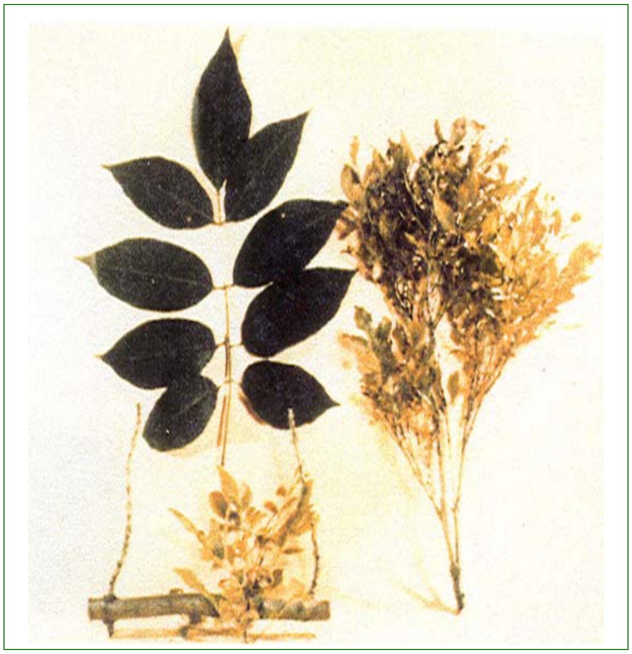


Figure 10-23 Witches' Broom on *F. americana*; healthy (left); foliar chlorosis (right), reduced leaf size and branch proliferation

Figure 10-24 *Fraxinus* excelsior leaflet showing a symptom of Arabis Mosaic Virus

References

1. Brierly, P. 1944. Viruses described primarily on ornamental or miscellaneous plants. P.D.R. Suppl. 150:145; 150; 184-85; 414; 436-37; 437; 448-49; 475.
2. Ciferri, R. et al. 1953. Anomalie fogliari dell'olivo Ligure e Gardesano. Ann. Sper. Agr. NS 7(6):1957-76.
3. Kuprevicz, V.F. 1947. The physiology of the diseased plant in relation to the general question of parasitism. 299 U.S.S.R. Academy of Sciences, Moscow (1951. Rev. Appl. Myc. 30:62).
4. Novak, J.B. 1958 Investigation on the virus diseases of the Oleaceae. Preslie 30(4):365. (Rev. Appl. Myc. 38:210. 1959.)
5. Plakidas, A.G. 1949. Witches' broom, a graft transmissible disease of Arizona Ash (Fraxinus berlandieri). Phytopath. 39(6):498-99.

Fraxinus Variegation Virus

Synonym
Fraxinus Infectious Chlorosis (Baur)

Hosts
Fraxinus spp.

Distribution
Bulgaria, England, and Germany

Symptoms
Systemic Yellow Chlorotic Leaf Spotting

Transmission
Grafting

Circular 23: Diseases of *Gladiolus* spp.

Puccinia gladioli [Castagne] (Federal Quarantine Significant)
August 2005

Synonyms

Aecidium valerianellae Biv., *Uredo gladioli* (Duby)

Hosts

Gladiolus spp. and *Valerianella* spp.

Distribution

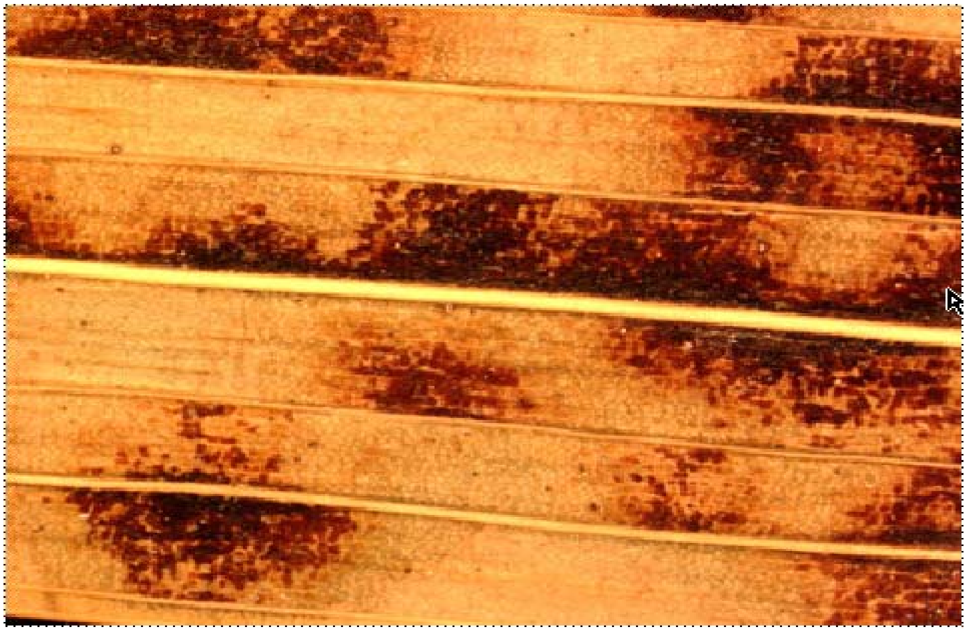
Reported on Gladiolus from Europe and Asia. Although telia of *Puccinia gladioli* on Gladiolus have **not** been reported from the U.S., the aecial state (*Aecidium valerianellae*) on Valerianella has been reported from the western U.S. as well as Europe and Asia.

Symptoms

Telia. Are on reddish spots, sometimes limited by the veins, minute, rounded, and densely crowded to actually running together to form a crust up to 1 cm. long. They can be found on the upper or lower surface of the leaf. They often cover much of the leaf surface and are compact and chestnut brown to black in color. The paraphyses (sterile, upward-growing basally attached, hyphal elements) are cylindric to slightly club shaped, brown, and up to 80 µm long.

Source: USDA–ARS

Figure 10-25 *Puccinia gladioli* telia



Source: USDA–ARS

Figure 10-26 ***Puccinia gladioli*** **telia**

Description

Teliospores. Are ellipsoid to clavate, apex round to acute, slightly constricted at the septum and gradually narrowing below the septum. They are 36 to 60 x 16 to 27 µm. The cell wall is smooth pale brown in color, 2 to 3 µm thick and up to 10 µm at the apex. Sometimes mesospores are present 24 to 40 x 17 to 17 µm. The pedicel is hyaline, persistent, and 10 to 60 µm long.

Notes

Uredinia are unknown on *Gladiolus* spp. Spermogonia and Aecia are found on *Valerianella* spp.

At this time this rust is **not** listed in CFR 319.37-2 as a Federal Quarantine Significant disease on Gladiolus. If this rust is added to that the list, the genus *Valerianella* spp. will also be regulated from Europe and Asia.

References

Hernandez, J.R. Invasive fungi. *Puccinia gladioli*. Systematic Botany & Mycology Lab., ARS, USDA (accessed August 24, 2005).

Puccinia mccleanii [Doidge] (Federal Quarantine Significant)

August 2005

Synonyms

None

Hosts

Gladiolus ludwigii (Hook)

Distribution

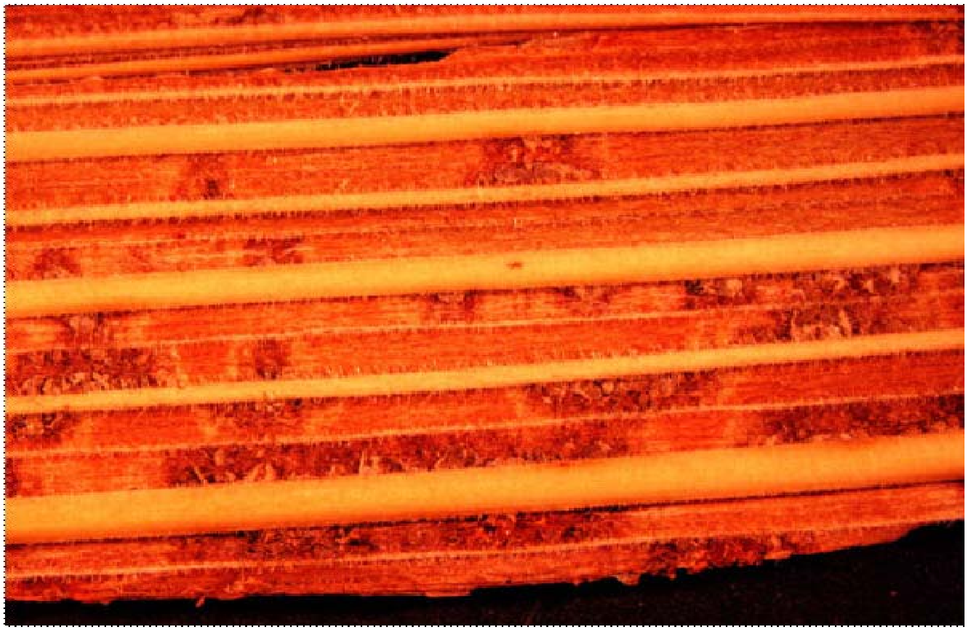
South Africa

Symptoms

Telia. Can be scattered or grouped, rounded to oblong, and sub-epidermal with the teliospores bursting through and surrounded by the epidermis thus presenting a powdery appearance. They can be on the upper or lower leaf surface. The telia are located between and sometimes transverse to the veins. When the telia are scattered, each can be up to 0.5 mm long and, when grouped, cover up to 1 cm of leaf surface. They are chestnut brown in color and are without paraphyses (a sterile, upward-growing, basally attached hyphal element).

Source: USDA–ARS

Figure 10-27 *Puccinia mccleanii* telia on leaf



Source: USDA–ARS

Figure 10-28 *Puccinia mccleanii* telia on leaf

Description

Teliospores are oblong-clavate to oblong, sometimes constricted at the septum. The upper cell of the teliospores is rounded truncate, attenuated or oblique-attenuated at apex, and the lower probasicial cell frequently narrower, cinnamon brown, lighter cinnamon brown in color at the base of the spore. The spores are (35 to) 50 to 60 (to 70) x (12.5 to) 14 to 17 (to 20) µm. The cell wall is 1 to 2 µm thick with the apex sometimes thicker at 4 (to 7) µm. The pedicel is up to 45 µm long, easily broken, and light cinnamon in color.

Notes

Spermogonia, aecia, and uredinia are unknown.

References

Hernandez, J.R. Invasive fungi. *Puccinia mccleanii*. Systematic Botany & Mycology Lab., ARS, USDA (accessed on August 24, 2005).

Uromyces gladioli [Henn.] (Federal Quarantine Significant)

August 2005

Synonyms

Uromyces geissorhizae Henn., *U. babianae* (Doidge), *U. romouleae* (Van der Byl and Werderm), *U. romuleae* (Doidge)

Hosts

Babiana spp., *Gladiolus* spp., *Geissorhiza* spp., *Moraea* spp., and *Romulea* spp.

Distribution

Central and Southern Africa

Symptoms

Uredinia. Can be scattered or in grouped, irregularly round to oblong, often running together measuring up to 0.5 mm in length. They can be on the upper or lower leaf surface. The uredinia are sub-epidermal with the spores bursting through the epidermis and are yellow in color.

Telia. Can be scattered or in linear groups, oval or oblong, often irregular, and up to 1 mm in length. They can be on the upper or lower leaf surface. The telia are sub-epidermal and compact with the spores covered by the epidermis, dark brown to black in color and are without paraphyses (a sterile, upward-growing, basally attached hyphal element).

Description

Urediniospores. Are globose, subglobose or ovate, and subhyaline to pale golden brown in color. These spores are 20 to 25 x 15 to 23 µm. The cell wall is hyaline and 2 to 3.5 µm thick, minutely verrucose with scattered germ pores 6 to 9 (obscure).

Teliospores. Are chestnut brown in color, globose, subglobose, ellipsoid, ovoid, or angular through mutual pressure. The apex is usually rounded, sometimes truncate or conical. The base is round or attenuate. The spores are 20 to 37 (to 40) x 18 to 26 µm. The cell wall is smooth, 2 to 3.5 µm thick, 5 to 9 µm thick at the apex. The pedicel is persistent, brown in color near the apex, and 5 to 7 mm wide up to 75 µm long.

Notes

Spermogonia and aecia are unknown.

References

Hernandez, J.R. Invasive fungi. *Uromyces gladioli*. Systematic Botany & Mycology Lab., ARS, USDA (accessed August 24, 2005).

Uromyces nyikensis [Syd. & P. Syd.] (Federal Quarantine Significant)

In progress.

Circular 24: Diseases of *Humulus* spp.

Hop Nettlehead Strain of Arabis Mosaic Virus

Revised Feb. 1992; restructured Feb. 1996

Synonyms

Chlorogenus humuli (Holmes), Humulus Virus 2, Silly-Hill Disease Virus

Host

Humulus lupulus L.

Distribution

Hop Nettlehead Strain of Arabis Mosaic Virus was first described in 1895. It has been recognized in England for over 50 years. Similar, if **not** identical, diseases are reported from Czech Republic, Germany, Poland, Bulgaria, Slovakia, Tasmania, and the former U.S.S.R.

Citations may be found in the literature where hop nettlehead strain of Arabis mosaic virus, infectious sterility, and Krauselkrankheit are used synonymously. Present knowledge leaves this open to doubt.

English workers, as reported by Talboys (1964), recognize infectious sterility as being confined to eastern continental Europe. They feel that Krauselkrankheit, reported in Germany and other areas of eastern Europe, may be due to zinc deficiency. Furthermore, they are of the opinion that hop nettlehead strain of Arabis mosaic virus **does not** occur in continental Europe but is probably present in the United States.

Hoerner (1949,1954) reports virus diseases in New York and on the Pacific coast with symptoms similar to those associated with hop nettlehead strain of Arabis mosaic virus.

Symptoms

(after Blattny 1935, Burgess 1964): Shortly after new growth starts, infected plants are characterized by their many weak vines and nettle-like leaves. Infected plants **do not** climb well and if severely infected, they are bunched on the lower three to five feet of the support. The stems are spindly, stiff, and short. These symptoms are more evident early in the season while the weather is cool. Symptoms may become masked as the temperature increases.

Leaves are undersized and closer together than normal. Younger leaves may exhibit an upcurling of the margins. There may be a slight vein clearing evident and the leaves may stand out stiffly from the stem.

Cone production is greatly reduced. Blattny (1935) has stated that the **only** reliable external sign of the disease is the sterility of infected hop plants during three consecutive years.

From reports in the literature it is apparent that symptoms vary from hill to hill, with the time of year observations are made, and with the amount of growth the plant has made.

Transmission

Hop nettlehead strain of Arabis mosaic virus can be transmitted by grafting. Burgess (1964) questions whether or **not** it might be mechanically transmitted in instances where adjacent vines may rub together. There is also some question as to the virus being soil-borne.

Recent investigations by Legg (1964), and Legg and Ormerod (1964) indicate that Hop Line Pattern Virus predisposes hops to infection by hop nettlehead strain of Arabis mosaic virus or that Hop Line Pattern Virus is a component of hop nettlehead strain of Arabis mosaic virus itself. Further studies revealed that Split Leaf Blotch Virus plus Hop Line Pattern Virus did **not** produce nettlehead, so evidently Split Leaf Blotch Virus is **not** a component of nettlehead.

Hop Line Pattern Virus has been proven to be soil-borne. This confirms the earlier theory suggested by Burgess that nettlehead may be soil-borne.

References

1. Blattny, C. and V. Vukolov. 1935. Infectious sterility of the hop. Rec. Inst. Rach. agron. Rep. tchecosl. 137:3-18.
2. Burgess, A.H. 1964. Hops. London:Leonard Hill; New York: Interscience Publishers Inc. 151-64.
3. Hoerner, G.R., 1949. Hop diseases in the United States. Brewers Dig. 24(4):45-51.

4. Hoerner, G.R., 1954. Virus diseases of hops. The Hopper 10(12):2-3.
5. Legg, J.T. 1964. Hop line-pattern virus in relation to the etiology and distribution of nettlehead disease, Am. Appl, Biol. 53(3):389-401.
6. Legg, J.T. and P.J.Ormerod. 1964. The association of split-leaf blotch virus with nettlehead disease of hops. Ann. Appl. Biol. 53(3):403-06.
7. Talboys, P.W. 1964. Diseases of the hop. Nature (London) 203(4949):1021-22.

Verticillium Wilt

Causal Organism
A strain of *Verticillium albo-atrum* (Reinke and Barth)

Synonyms
Verticillium albo-atrum of hops, fluctuating strain, *Verticillium albo-atrum* of hops, progressive strain

Hosts
Humulus lupulus L., *Lycopersicum asculentum* Mill., *Solanum tuberosum* L. The hop strain can probably parasitize many or most of the same plants as the parent species but to a varying extent.

Distribution
England, Germany, New Zealand, and Tasmania

The report from Tasmania names *V. dahliae* as the causal organism, but this species is **not** uniformly treated as distinct from *V. albo-atrum*. The disease caused is similar. The first reports from New Zealand also named *V. dahliae* as the fungus involved, but this was later corrected to *V. albo-atrum*. Present research (Talboys) indicates that morphological characteristics can be used to clearly distinguish between the two species. As a result, more workers are accepting *V. albo-atrum* as the species involved in hop wilt.

Symptoms
The virulent or progressive form appears on a few plants. The lower leaves show “first yellowing and then gradual death of more and more leaves on the vines until eventually the whole plant is dead.”

Sometimes the tissue between the veins turns dark brown while that along the veins remains yellow giving a characteristic effect the English call “tiger striping.” The dead leaves fall off leaving the stem bare. In the stem, the vascular tissue becomes brown, at first on one side, but later it may all be involved. The infected plants are doomed. The Fuggle variety is very susceptible. This is one of the most valuable commercial varieties. Some progress has been made in developing resistant varieties.

The fluctuating form of the disease is milder. The leaves show no discoloration, but there is usually swelling in the vines, and browning of the vascular tissue is evident. Although the infected plants may wilt, they eventually recover and are rarely killed.

References

1. Keyworth, W.G. and J. Paine. 1950. Diseases of hops. Ann. Rep. East Malling Res. Sta. for 1949.
2. Talboys, P.W. 1964. Diseases of the hop. Nature (London) 203(4949): 1021-22.

Circular 25: Diseases of *Hydrangea* spp.

Hydrangea Rust (Federal Quarantine Significant)

August 2005

Causal organism

Puccinia glyceriae S. Ito

Synonyms

Aecidium hydrangeae-paniculatae (Dietel)

Hosts

Hydrangea paniculata (Siebold) and *Glyceria* spp.

Distribution

Japan

Symptoms

Spermogonia located mostly on the upper surface of the leaf and located in orange-yellow lesions.

Aecia located mostly on the lower surface of the leaf are cup shaped and pale yellow in color. The cells of the wall of an aecium are 24 to 32 x 16.5 to 22 µm. The outer wall has a pronounced warty appearance and the inner wall is much less so.

Description

Spermatia are yellow to brown in color, sub-epidermal, and flask shaped.

Aeciospores are globose to broadly ellipsoid. They are 19 to 26.5 x 15 to 22 µm with walls 0.7 to 1.2 µm thick and are hyaline and finely verrucose.

Notes

The uredinial and telial stages of this rust are found on species of *Glyceria* (Poaceae).

Figure 10-29 Puccinia glyceriae

Figure 10-30 *Puccinia glyceriae* close up

References

Hernandez, J.R. Invasive fungi. *Puccinia glyceriae*. Systematic Botany & Mycology Lab., ARS. USDA. http://nt.ars-grin.gov/sbmlweb/OnlineResources/FungiOnline.cfm (accessed August 30, 2005).

Circular 26: Diseases of *Jasminum* spp.

Bacterial Leaf Spot of Jasmine

Causal Organism

Xanthomonas jasminii (Rangaswami & Erwaran)

Synonyms

None

Hosts

Jasminum sambac (L.) Ait.

Distribution
India (Madras State)

Symptoms
The disease first appears as minute water-soaked lesions on the upper leaf surfaces. These lesions soon become yellowish-green in color and enlarge in size. The spots may then coalesce to form linear or irregular spots that give a characteristic mosaic-like appearance to the leaf. On each leaf several spots may be closely crowded, but in some varieties there may be **only** a few localized spots. In the case of several affected plants, there is defoliation and stunted growth. Transverse sections of the leaves clearly show the presence of bacteria in the infected tissue. No other species appears to be attacked by this bacterium.

References
Ragaswami, G. and K.S.S. Eswaran. 1961. A bacterial leafspot disease of Jasminum. Curr. Sci. 30(9):352.

Chlorotic Ringspot, Phyllody, Yellow Ring Mosaic Disease (Federal Quarantine Significant)
In progress.

Jasmine Variegation Agent (Federal Quarantine Significant)
Revised Oct. 1987; restructured Feb. 1996

Synonyms
None

Hosts
Jasminum officinalis L., *J. humile* var. *Revolutum* (Sims), J. Stokes, *J. resolutum* Sim

Distribution
Belgium, Great Britain, and Germany

Symptoms
“Yellow variegation in the leaves and young branches” (Brierley 1944). In 1713, a clergyman, John Lawrence, described it as follows: “You will find here and there some leaves tinged with yellow, even on other branches **not** inoculated, till by degrees in succeeding years the whole tree, even the very wood of all the branches, shall be most beautifully stripped and dyed with yellow and green intermixed.”

A similar disease, but differing in that ring spots are among the symptoms, has been reported in the Rio Grande Valley of Texas (Hort. Soc. Jour. 14:187-88).

Transmission

By budding and grafting

References

1. Atanasoff, D. 1935. Old and new virus diseases of trees and shrubs. Phytopath. Zeitschr. 8(2):212; 197-223.
2. Brierley, P. 1944. Viruses described primarily on ornamental or miscellaneous plants. P.D.R. Suppl. 150:145; 150; 184-85; 414; 436-37; 437; 448-49; 475.
3. Lawrence, J. 1715. The clergyman's recreation 65. (abs. W.A. Orton. 1924. An early report of infectious chlorosis. Phytopath. 14:198-99).

Sampaquita Yellow Ringspot Mosaic Disease (Federal Quarantine Significant)

In progress.

Circular 27: Diseases of *Juniperus* spp.

Juniper Pear Rust (Federal Quarantine Significant)

Revised and restructured Feb. 1996

Causal Organism

Gymnosporangium asiaticum (Miyabe ex Yamada)

Synonyms

G. chinense Long, *G. haraeanum* Syd., *G. koreaense* Jackson, *G. spiniferum* Syd., *Roestelia koreaensis* P. Henn.

Hosts

Telial. *Juniperus chinensis*. L.

Aecial and Pycnial. *Cydonia oblonga* Mill., C. (*Chaenomeles*) *sinensis* Thouin, *Chaenomeles japonica* (Thunb.) Lindl. ex Spach., *Malus* (*Pyrus*) *sieboldii* (Regel) Rehd., *Pyrus communis* L., *P. pyrifolia* var. *Culta* (Makino) Naka. (*P. serotina* var. *culta*), *P. ussuriensis* Maxim (*P. sinensis*) *Photinia* spp.

Distribution

Eastern Asia and United States (East and West Coasts)

Symptoms

Pycnial. On the upper surface of the leaves, on spots, first small, punctiform and orange-yellow in color, gregarious in groups 2.5 mm in diameter, few in number, pycnospores small fusoid.

Aecial. On the underside of the leaf opposite the Pycnia on thickened, well-developed, brown spots having a beautiful, yellowish-red margin, very slender, 3 to 6 mm high, cinereous; peridium tubular, **not** recurved in dehiscence, irregularly torn at the end, liberating reddish-brown aeciospores.

Telial. On the leaves (needles) of Juniperus, forming reddish-brown, gelatinous masses, dark chestnut when dry, pulvinate. It may be added that the telia are small when dry measuring about 2 mm high and 1 mm thick, but when wet, they are swollen to about 15 to 20 mm in length and proportionate width. Good illustrations may be found in Jackson's (1916) paper.

Description

Aeciospores. Globose to broadly ellipsoid, often slightly angular 17 to 25 µm in diameter, the wall is yellow, finely and densely verrucose, 1.5 to 2.5 µm thick, and about 6 to 8 pores, slightly thickened.

Teliospores. Broadly to narrowly ellipsoid, 2 celled, slightly constricted, 32 to 47 x 15 to 25 µm. The wall is yellow to cinnamon in color, 1 to 1.5 µm thick, pores 2 per cell by the septum.

Figure 10-31 ***Gymnosporangium asiaticum*** **on Juniperis; telial spores**

References

1. Arthur, J.C. 1934. Manual of the rusts in the United States and Canada. Lafayette, IN:Purdue Research Foundation. 173; 270; 366-67.
2. Farr, D.F. et al. 1989. Fungi on plants and plant products in the United States. St. Paul, MN:APS Press 564-65; 726; 979.
3. Jackson, H.S. 1916. An Asiatic species of Gymnosporangium established in Oregon. J. Agrl. Res. 5:1003-09.
4. Laundon, G. 1977. Gymnosporangium asiaticum. in: CMI descriptions of pathogenic fungi & bacteria. #541 CAB/CMI:Kew, Surrey, England.
5. Tanaka, T. 1922. New Japanese fungi. Notes and translations XII. Mycologia 14:282-95.

Juniper Rust

December 13, 1965; restructured Feb. 1996

Causal Organism

Gymnosporangium japonicum Syd.

Synonyms

Gymnosporangium photiniae (Kern), *Roestelia photiniae* P. Henn., *R. pourthiaeae*

Hosts

Telial. *Juniperus chinensis* L., *J. chinensis* var. *pfitzeriana*, Spaeth. Possibly others

Aecial and Pycnial. *Heteromeles* (Photinia) *arbutifolia* M. Roem., *P. villosa* (Thunb.) D.C. (Possibly) *Pyrus pyrifolia* (Burm.f.) Nakai (*P. serotina*)

Distribution

China, France, Holland, Japan, Korea, Siberia, United States (coastal areas)

Symptoms

Aecial. Described from herbarium material; no published description found. They appear on the upper surface of the leaf as reddish-yellow spots with a darker center. The darkening is caused by the presence of the tiny black pycnia that erupt through the epidermis. The spots are round with an indefinite margin, and measure 2 to 3 mm in diameter. On the lower surface the spots are yellowish to cinnamon-brown in color and are much swollen in the center; the swollen area is occupied by the aecia that are clustered there and appear to the eye as slender, light-colored hairs projecting down and outward. On the specimen examined, they are about 2 mm long.

Telial. The telia are born on the stems and twigs of *Juniperus* on fusiform swelling or galls. Dried telia are cinnamon-brown in color and appear villous or felty due to the telial horns.

Figure 10-32 *Gymnosporangium japonicum* on *Juniperis* spp.; sori on branches

Description

Aecia hypophyllous, in crowded or somewhat annular groups on thickened discolored spots, cylindric,.4 to.5 mm in diameter by 2 to 3 mm high, peridium soon becoming irregularly lacerate and cancellate often to base, erect or slightly spreading; peridial cells seen in both face and side views, broadly lanceolate or oval in face view, 29 to 32 x 64 to 90 µm, oblong in side view, 23 to 32 µm thick, coarsely rugose on both inner and side walls, the ridges becoming much higher on the side walls and extending clear across. Outer wall 1.5 to 2 µm thick, inner and side wall 5 to 7 µm; aeciospores, 18 to 21 x 19 to 23 µm, wall pale cinnamon-brown in color, 1.5 to 2 µm thick, and very finely verrucose.

Telia caulicolous, appearing on gradual fusiform enlargements scattered irregularly wedge-shaped, often incised at apex and lacunose below, 3 to 5 µm high, cinnamon-brown in color, teliospores 2-celled ellipsoid, 18 to 22 by 57 to 66 µm, **not** or very slightly constricted, usually narrowed above and below, wall pale cinnamon-brown, rather thin, 1 to 1.5 µm; pores 2 in each cell, near the septum.

References

1. Arthur, J.C. 1934. Manual of the rusts in the United States and Canada. Lafayette, IN:Purdue Research Foundation. 173; 270; 366-67.
2. Kern, F.D. 1911. A biologic and taxonomic study of the genus Gymnosporangium. N.Y. Bot. Gard. Bull. 7:391-494.
3. Long, W.H. 1914. An undescribed species of Gymnosporangium from Japan. J. Agrl. Res. 1:353-56.
4. Tanaka, T. 1922. New Japanese fungi. Notes and translations XII. Mycologia 14:282-95.
5. Viennot-Bourgin, G. 1935. (A note on Gymnosporangium japonicum Syd.) in Bull. Soc. Sci. Seine-et-Oise Ser. III, 111, 1-3:1-17.

Needlecast Disease (Federal Quarantine Significant)

Revised and restructured Feb. 1996

Causal Organism

Stigmina deflectens Karst Ellis

Synonyms

Exosporium deflectens Karst.

Hosts

Juniperus spp.

Distribution

Austria, Finland, Romania, USA (SD)

Symptoms

Minute brownish fruiting bodies of the fungus are arranged along the sides of the median veins of the upper side of the needles, but these fruiting bodies **do not** appear until the leaves have begun to turn brown.

As both the leaves of Juniperus and the fruiting bodies are very small, and because many other rather similar fungi may also be present on the leaves, it is unlikely the disease can be recognized by the macroscopic symptoms. If there is reason to suspect *S. defectens* is present, submit for microscopic examination any twigs showing dead brown leaves and needle shedding to the Postentry Quarantine Unit.

Description

Stomata up to 200 µm wide, and dark brown in color. Conidiophores are 6 to 15 x 2.5 to 4 µm with up to 4 annellations. Conidia are brown in color, verruculose, 2 to 3 septate, 11 to 19 x 4 to 5.5 µm.

References

1. Ellis, M.B. 1959. Clasterosporium and some allied Dematiaceae Phragmosporae. II Comm. Mycol. Inst. Papers #72.
2. Ellis, M.B. 1976. More dematiaceous hyphomycetes. CAB/CMI:Kew, Surrey, England 119.
3. Farr, D.F. et al. 1989. Fungi on plants and plant products in the United States. St. Paul, MN:APS Press 564-65; 726; 979.
4. Karsten, P.A. 1888. Fragments of mycology. Finnish, XVII, Hedwigia 22:259.
5. CFR 319.37§2 (1-1-95).

Circular 28: Diseases of *Larix* spp.

- Douglas Fir Canker (Federal Quarantine Significant) 10-22
- European Larch Canker (Federal Quarantine Significant) 10-76

European Larch Canker (Federal Quarantine Significant)

In progress.

Circular 29: Diseases of *Ligustrum* spp.

- Ligustrum Mosaic Agent (Federal Quarantine Significant) 10-76

Ligustrum Mosaic Agent (Federal Quarantine Significant)

Revised and restructured Feb. 1996

Synonyms

Ligustrum Variegation Virus, Ligustrum Infectious Chlorosis, *Marmor ligustri* Holmes

Hosts

Ligustrum vulgare L. (Common Privet)

Distribution

Europe

Symptoms

Clear yellow leaf spotting (Brierly 1944) and systemic chlorotic spotting (Holmes 1939) have been reported. Baur (1907) wrote that the chlorotic plants he produced by budding and grafting had “yellow spotted leaves” as those found on *Ligustrum vulgare* var. *aureovariegatis*.

Figure 10-33 Ligustrum Mosaic Agent on *Ligustrum* spp.

NOTICE

A virus designated as "yellow spot" was investigated more recently by Schmelzer (1962) who reported that it **does not** belong to the ring spot group of viruses. It was transmitted from Ligustrum to Ligustrum by grafting.

Another virus designated as "crinkle mosaic" (Schmelzer 1962) and regarded as a strain of Arabis mosaic virus was obtained from expressed leaf sap of plants infected by crinkle mosaic. This virus produces marked necrotic symptoms on a number of different hosts.

Transmission

By budding and grafting; **not** transmitted through the seed.

References

1. Baur, E. et al. 1907. Uber eine infektiose Chlorosen bei Ligustrum, Laburnum, Fraxinus, Sorbus, and Ptelea. Bericht. d. Deutsch. Bot. Gesellsch. 25:410-13.
2. Bergey, D.H. et al. 1948. Manual of determinative bacteriology. 6th ed. Baltimore:The Williams & Wilkins Co. 1187.

3. Brierley, P. 1944. Viruses described primarily on ornamental or miscellaneous plants. P.D.R. Suppl. 150:145; 150; 184-85; 414; 436-37; 437; 448-49; 475.
4. Holmes, F.O. 1939. A handbook of phytopathogenic viruses. Minneapolis. MN:Burgee Publishing Co. 51; 52; 112-13.
5. Scmelzer, K. 1962. Untersuchungen an Viren der Zier-und Wildgeholze. 2. Mitteilung. Virosen an Forsythia, Lonicera, Ligustrum, und Laburnum. Phytopathologische Zeitschrift 46:105-38.
6. CFR 319.37§2.

Circular 30: Diseases of *Litchi* spp.

Phytophthora litchii (Federal Quarantine Significant)

July 2012

Synonyms

Peronophythora litchii

Hosts

Dimocarpus longan (longan); *Litchi chinensis* (litchi/lychee)

Distribution

China, Thailand, Vietnam, Taiwan, Japan, and Papua New Guinea

Symptoms

Fruit has downy blight; droopy leaves and leaf blight; immature plants present with water-soaked lesions that turn into brown, round, or irregular lesions (approximately 3 to 5 cm long), mature plants present with dark bron lesions on the stem and numerous sporangia on sporangiophores

References

1. Ann, PJ, JN Tsai, and HR Yang. 2012. First report of leaf and stem down blight of longan seedlings caused by *Peronophythora litchii* in Taiwan. Plant Disease DOI: 10.1094/PDIS-01-0009-PDN.

Circular 31: Diseases of *Malus* spp. and *Pyrus* spp.

- Apple Proliferation Phytoplasma (Federal Quarantine Significant) 10-85
- Chlorotic Leafspot Virus 10-85
- Rough Bark (Phompsis Canker) (Federal Quarantine Significant) 10-86
- Rubbery Wood Phytoplasma (Federal Quarantine Significant) 10-88
- *Valsa ceratosperma* (V. mali) (Federal Quarantine Significant) 10-88

Apple Branch Canker

Revised and restructured Feb. 1996

Causal Organism

Valsa ceratosperma (Tode ex Fr.) Maire (Perfect state), *Cytospora sacculus* (Schwein.) Gvritischvili (Imperfect state)

Synonyms

Valsa mali (Miyabe and Yamada)

Hosts

Malus pumila Mill., M. X. zumi Mats. Rehd. (*Populus nigra* Linn., *Salix sachalinensis* Friedr. Schmidt., *Prunus serrulata* Lindl., and *P. yedoensis* Mats. have been inoculated successfully, but infection died out within one year.)

Distribution

Japan, China, and Korea

Symptoms

In the early spring, the bark presents a swollen, water-soaked appearance especially when wet. The spots are brownish in color, irregular or nearly oblong in circumference, with gradual drying, the somewhat elevated canker becomes slightly sunken, more or less darkened, and cracked on the surface. Cankers are usually found on the upper side of large limbs of older trees. A large number of small, black pycnidia appear in late May on recent lesions, and spore horns are visible approximately one month later. A girdling type of injury has also been observed on weakened branches and small twigs. Girdling is rare in the first year of infection.

Description

Pycnidia and perithecia of the pathogen occur in a stroma in the bark, punctiform or wart-like, of various sizes (in culture 1 to 3 mm in diameter), junction with the sound tissue indefinite, black; pycnidia deeply immersed in the stroma, divided into many irregular chambers (Togashi 1924) flask-shaped (Tanaka 1919), opening by a slender, canal-like neck, 80 to 200 µm in diameter; conidia cylindrical or allantoid, obtuse at both ends, 4 to 10 x.8 to 1.7 µm (Togashi 1924), expelled in yellow (Togashi 1924), buff (Tanaka 1919) cirrhi; perithecia circinate surrounding the pycnidial cavity, flash-shaped, long-necked, with black walls, the necks thickened above and slightly protruding, 100 to 250 µm in diameter; asci numerous, clavate, often pedicellate, 24 to 42 x 5.5 to 15 µm hyaline, 8-spored, aparaphysate; ascospores cylindrical, slightly curved continuous, hyaline, 7 to 10 x 1.4 to 2.1 µm.

Notes

The disease is reported to have seriously damaged a large number of apple trees in Japan, where it is said to have appeared following the introduction of American apple varieties. Its appearance at that time might be explained either by the introduction of the disease on the American varieties, or by increased virulence of a Japanese fungus on an introduced host. Suggesting the first of these explanations, Togashi (1924) states the Valsa mali corresponds better to the description of the disease described by Leonian (1921) in New Mexico than does V. leucostoma (Pers.) Fr. to which Leonian (1921) attributed it. This statement apparently applies **only** to the disease caused by the fungus and its visible symptoms as Leonian (1921) did **not** give the characters of the organism, V. leucostoma, in his paper. The description of the latter fungus (Saccardo 1888) shows differences in the shape of the asci, and in the size of the ascospores.

References

1. Hunt, R. and A.L. Lohr. Foreign diseases of *Malus*, *Pyrus*, and *Cydonia*. FPQM 10:30-3 (processed).
2. Leonian, L.H. 1921. Studies on the Valsa apple canker in New Mexico. Phytopath. 11:236-43.
3. Saccardo, P.A. 1888. Sylloge Fungorum. 1:470; 7:598; 7:739; 24:754; 25:713-14; 25:762. Ann Arbor, MI: V.W. Edwards (reprinted 1944).
4. Sakuma, T. 1990. Valsa canker. in: Compendium of apple and pear diseases. A.L. Jones and H.S. Aldwinckle (eds.). Minneapolis, MN:APS Press 39-40.
5. Tanaka, T. 1922. New Japanese fungi. Notes and translations VII. Mycologia 11:148-54.

6. Togashi, K. 1924. Some studies on a Japanese apple canker and its causal fungus Valsa mali. J. Coll. Agric. Hokkaido Imp. Univ. (Sapporo Japan) 12:265-324.

Apple Canker

Revised Oct. 1965; restructured Mar. 1996

Causal Organism

Perfect State. P*hysalospora piricola* Nose

Imperfect State. *Macrophoma kuwetsukai* Hara

Hosts

Malus sylvestris Mill. (apple) *Pyrus communis* L. (pear)

Symptoms

On Trunks and Branches. Lesions are nearly circular to elliptical **except** when, by coalescence, they become irregular in shape. Separated from the sound tissue by a crack or crevice around the margin, and slightly depressed, brown to gray in color, many fruiting bodies on the surface, which is raised at the center and, at the last, broken open.

On Leaves. Brown to dark brown spots are formed that are rather round or elliptical surrounded by a ring, but when the spots become confluent, they take irregular shapes.

Description

(after Nose 1933) Perithecia, ostiolate, carbonous, black, spherical or semispherical, 230 to 300 µm high by 130 to 280 µm wide (average 245 x 229 µm); asci 8-spored, several of different ages, develop on the base, long clavate wall rather thin **except** at the apex, inner wall grooved, 93 to 121.3 x 20.3 to 23.2 µm (average 114.4 x 22.2 µm); ascospores distichous, elliptical, hyaline or greenish-blue in color, continuous, 21.7 to 22.6 x 10.4 to 12.2 µm (average 22.2 x 11.4 µm) no gelatinous sheath; paraphyses many, hyaline, simple, 2.9 to 6.1 µm thick.

Pycnidia submerged, ostiole short, carbonous, dark brown nearly spherical, 170 to 250 high x 200 to 250 µm wide (average 184 to 204 µm); conidiophores lining the whole wall, clavate, hyaline, continuous, simple, 11.6 to 31.9 x 2.9 to 4.4 µm (average 20.30 x 3.19 µm); pseudoparaphyses hyaline, non-septate unbranched 34.8 to 63.8 x 2 to 3.5 µm (average 47 x 2.9 µm); conidia fusoid or long elliptic, hyaline, continuous, 21.8 to 31.9 x 6.7 to 8.7 µm (average 26.5 x 7.5 µm).

Perithecia and pycnidia may be intermixed on the same lesion.

References

Nose, T. 1933. On the physiologic specialization of P. oryzae in Korea. Ann. Agr. Exp. Sta. Chosen 7(2):156. (in Japanese).

Apple Mosaic Virus

Synonyms

Infectious Variegation, Line Patter, Mottle Leaf, Mosaic Chlorosis, Pear, Ring Patter Mosaic, Pyrus Virus 2

Time of Year to Inspect

Within six weeks after leaves are fully out

Symptoms

Plant. Somewhat stunted compared to healthy plants of the same age.

Leaf. Has many forms of mottling. Small irregular yellow-to-cream spots that stand out vividly against the dark green of normal tissue. Spots turn brown and become necrotic as the season progresses. Bands of yellow may develop along the larger veins.

Stems. None

Fruit. None

Flowers. None

Transmission

Mechanical and grafting

Discussion

There are several strains of Apple Mosaic Virus. In New Zealand tests, severely infected trees, after several years of production, yielded **only** 33% of the fruit of healthy trees grown under similar situations.

Distribution

Argentina, Australia, Austria, Belgium, Brazil, British Isles, Bulgaria, Canada, Chile, China, Czechoslovakia, Denmark, Finland, France, Germany, Holland, India, Italy, Japan, Kenya, Latvia, New Zealand, Norway, Poland, Rhodesia, Romania, South Africa, Sweden, Switzerland, Turkey, United States, U.S.S.R., and Yugoslavia.

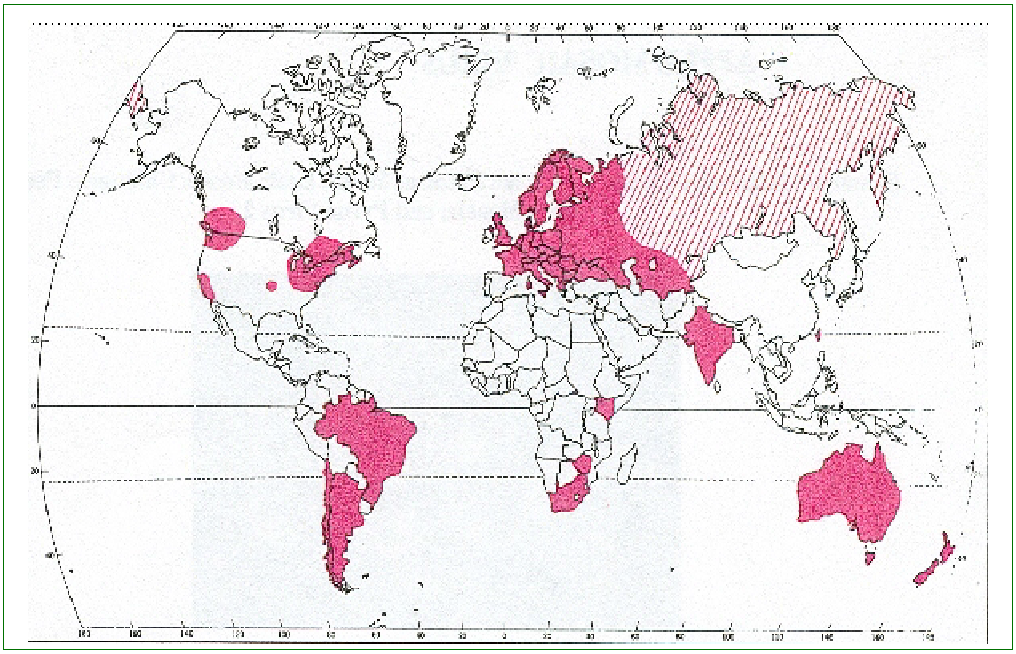


Figure 10-34 Distribution of Apple Mosaic Virus

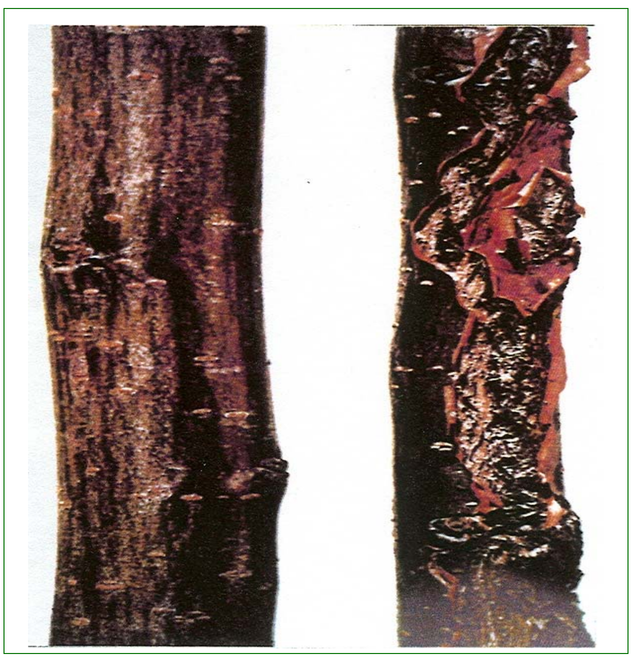


Figure 10-35 Bark cankers (right) on second-year wood of *Pyrus* variety of "Winter Nelis" caused by Pear Blister Canker Viroid

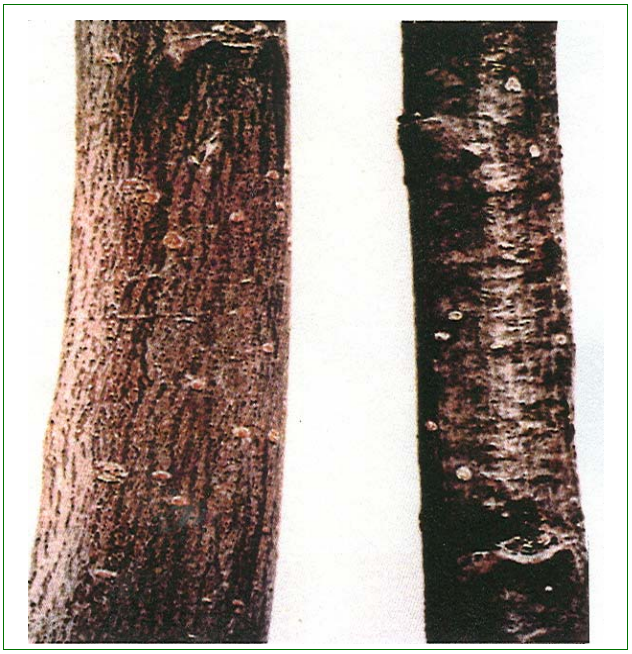


Figure 10-36 Roughening, brown mottling and blistering (right) of second-year wood of *Pyrus* spp. "pattern"; symptoms caused by Pear Blister Canker Viroid

References

1. Anonymous. 1963. CMI Plant Disease Distribution Map #354 ed. 2. CMI/ CAB: Surrey, England.
2. Gilmer, R.M. 1956. Probable coidentity of Shiro plum line pattern virus and apple mosaic. Phytopath. 46:127-28.
3. Hunter, J.A. et al. 1958. Note on transmission of apple mosaic by natural root grafting. N.Z.J. Agr. Res. 1:80-82.
4. Kemp, P. 1971. Deciduous fruit in Rhodesia. Tech. Bul. Rhodesia Min. Agr. 13:55-60 (Sect. 9).
5. Krause, R. et al. 1970. Preliminary symptom studies on virus diseases of deciduous fruit trees in Chile. Agr. Tec. 30(4):215-17.
6. Kristensen, J.R. and A. Thomsen. 1970. Virussygdomme hos Aebletraeer. Tidsskr. 74(1):1-23.
7. McCrum, R.C. et al. 1960. Apple virus diseases. Joint bulletin as: ME Agr. Exp. Sta. Bul. 595, NH Agr. Exp. Sta. Tech. Bul. 101.
8. Nicolaescu, M. 1970. Experimental investigations concerning apple mosaic virus in Romania. Revue roum. Biol. Ser. bot. 15(2):119-23.
9. Ozkan, M. and S. Kurcman. 1976. Virus diseases observed in Central Anatolian apple orchards. Bitki Koruma Bul. 16(2):106-15.

10. Posnette, A.F. 1963. Virus diseases of apples and pears. CAB Tech. Com. 30:19-21.
11. Rakus, D. and V. Maliarcikova. 1976. Vyskyt virosovych a mykoplazmalickych chorob Jablome. Ochrama Rostin 12(3):171-80.
12. Smith, K.M. 1972. A textbook of plant virus diseases. New York:Academic Press. 25-27; 121-27; 149.
13. Wei, N.S. 1963. A preliminary report of the apple mosaic virus, Acta phytopath. Sinica 6(1):48-67.
14. Welsh, M.F. and F.W.L. Keane. 1961. Diseases of apple in British Columbia that are caused by viruses or have the characteristics of virus diseases. Can. Plt. Dis. Survey 41(3):123-47.
15. Wood, G.A. et al. 1975. Field studies with apple mosaic virus. N.Z.J. Agr. Res. 18:399-404.
16. Zawadzka, B. et al. 1967. Nature and distribution of pome fruit viruses in Poland. P.D.R. Suppl. 51(2):115-20.

Apple Proliferation Phytoplasma (Federal Quarantine Significant)

Causal Organism
Candidatus Phytoplasma mali (Seemuller & Schneider) (Federal Quarantine Significant)

Host
Corylus avellana

Symptoms
Yellowing, sparse foliage, stunting, dieback, and general decline

For further information, *See* Apple Proliferation Phytoplasma (Federal Quarantine Significant) on page 10-29.

Chlorotic Leafspot Virus

Hosts
Malus spp.

Distribution
Canada and United States

Symptoms

This is a virus disease of apple that might be confused with Apple Mosaic. In this disease the patterns are quite similar to the line pattern and flecking expressions of Apple Mosaic but the color **does not** progress to yellow or white. In fresh leaves the lines and flecks are a faint grayish-white in color.

According to Welsh and Keane (1961) "Leaves of infected trees have chlorotic flecks associated with veins and veinlets. These are usually accompanied by leaf puckering and dwarfing. Symptoms are most severe on the leaves that develop early in the season." Chlorotic leafspot symptoms have also been associated with stem pitting symptoms.

References

1. McCrum, R.C. et al. 1960. Apple virus diseases. Joint bulletin as: ME Agr. Exp. Sta. Bul. 595, NH Agr. Exp. Sta. Tech. Bul. 101.
2. Welsh, M.F. and F.W. L. Keane. 1961. Diseases of apple in British Columbia that are caused by viruses or have the characteristics of virus diseases. Can. Plt. Dis. Survey 41(3):123-47.

Rough Bark (Phomopsis Canker) (Federal Quarantine Significant)

Revised and restructured Mar. 1996

Causal Organism

Perfect state. *Diaportle perniciosa* Em. Marchal

Imperfect state. *Phomopsis mali* Roberts

Synonyms

D. eres Nitschke and *D. mali* Miura

Hosts

Malus spp. and *Pyrus* spp.

Distribution

Japan, Europe, and North America

Symptoms

Pale, discolored spots are produced on the leaves measuring 1 to 2 cm in diameter. Spotted leaves become curled, and finally fall before their time.

NOTICE

Phomopsis rough bark refers to distinctive symptoms produced on the apple cultivar “Yellow Newton.” The first symptom is sunken areas in the bar. These later enlarge, blacken, and crack open at the margins, giving the tree a rough bark appearance (Rosenberger 1990).

On the fruits, mature spots measure 2 to 8 mm in diameter. They are round, solitary, or irregularly coalescent, more or less sunken, usually deeper in color than the surrounding tissue. The underlying tissue is brown to dark-brown in color, of spongy texture, and has a slightly bitter taste.

Description

D. perniciosa. Produces perithecia on twigs that are spheroid or oblate spheroidal, 300 to 450 µm in diameter, outer wall intensely black, inner wall light brown, beaks long, conspicuously hairy near the end; asci fusoid, obtuse above, somewhat pedicellate below, 45 to 52 x 5 to 10 µm, 8-spored; ascospores biseriate, fusoid, both ends obtuse, 1-septate, constricted, 2-nucleate in each cell (guttulate?) hyaline, 11 to 13 x 3.5 to 4.5 µm.

Phomopsis. *Pycnidia* of the Phomopsis state on decayed fruit, numerous, irregular, scattered or in concentric zones, later covered by white or olivaceous-white, cottony hyphae, semi-spherical, 70 to 220 x 70 to 130 µm, conidia issuing in a pinkish-brown cirrhus or mass, of two kinds A-spores ellipsoidal, acute at both ends, continuous, hyaline, guttulate at both ends, 7 to 9 x 3 to 4 µm; B-spores filiform, slightly curved, or may be hooked near the end cylindrospores are also produced. Chlamydospores in chains, cinereous or greenish, thick-walled, granulate, 10 to 14 x 5 to 8 µm; cylindrospores straight or curved, tapering towards the apex, pale pinkish-brown in mass, colorless or greenish when alone, 2 to 7 septate, occasionally constricted at the septum, 38 to 80 x 3 to 4 µm.

References

1. Hunt, R. and A.L. Lohr. Foreign diseases of Malus, Pyrus, and Cydonia. FPQM 10:30-3 (processed).
2. Miura, M. 1915. Agr. Exp. Sta. Bull. Aomori-ken, Japan. #15:77-116.
3. Rosenberger, D.A. 1990. Phompsis canker, rough bark and fruit decay. in: Compendium of apple and pear diseases. A.L. Jones and H.S. Aldwinckle (eds.) Minneapolis:APS Press 38-39.
4. Saccardo, P.A. 1888. Sylloge Fungorum. 1:470; 7:598; 7:739; 24:754; 25:713-14; 25:762. Ann Arbor, MI: V.W. Edwards (reprinted 1944).
5. Tanaka, T. 1919. New Japanese fungi. Mycologia 11:148-54.

Rubbery Wood Phytoplasma (Federal Quarantine Significant)

Hosts

Malus spp.

Distribution

Australia, Canada (B.C.), Denmark, England, Italy, New Zealand, Norway, Sweden, Switzerland, The Netherlands, and United States (experimental plantings **only**)

Symptoms

(after Brase and Gilmer 1959) Affected trees are slightly stunted and their branches and trunks are very definitely rubbery when touched or bent. In each case the side branches developing from the trunk showed the characteristic "bottle-neck" growth habit associated with rubbery wood; that is, thickening at a point near the origin with an abrupt and pronounced taper of the growth from there outward.

Smith (1972) stated that "affected maiden trees frequently develop a vigorous side branch from a point a few inches above ground level and this branch may outstrip the leader." The wood is **not** fully lignified as can be seen when a branch is cut across and properly stained. No diagnostic fruit or leaf symptoms have been recognized.

References

1. Brase, K.D. and R.M. Gilmer. 1959. The occurrence of rubbery wood virus of apple in New York. Plt. Dis. Reptr. 43:157-58.
2. Smith, K.M. 1972. A textbook of plant virus diseases. New York:Academic Press. 25-27; 121-27; 149.

Valsa ceratosperma (V. Mali) (Federal Quarantine Significant)

In progress.

Circular 32: Diseases of *Mangifera* spp.

Ceratocystis manginecans (sudden decline of mango)

Causal Organism
Ceratocystis manginecans

Synonyms
Mango killer

Hosts
Mangifera indica

Distribution
Oman, Pakistan, and United Arab Emirates; is now spreading from the eastern region of Sharjah Emirate to the Bathnah, Masafi, Dhena, Dabaa, and Kalbaa regions.

Symptoms
Disease characterized by sudden browning and wilting of leaves on mango trees, branches gradually drying out until the whole plant dies.

Transmission
The primary insect vectors are fungal-feeding insects (*Nitidulidae*, *Coleoptera*) **not** associated with particular plants. Ambrosia beetles such as *Xyleborus* and *Hypocryphalus* species may facilitate the fungal dispersal by tunneling through infested wood and expelling frass with fungal spores.

The pathogen can also be transmitted through various kinds of infected host debris, i.e., infected insect frass and sawdust spread by wind, rain, or running water. The pathogen can also be transferred from wood or wood packaging material on infected insect frass, sawdust, or on cutting tools and other equipment.

Notes

The fungus prevents the movement of water and nutrients from the roots to the branches and twigs of the mango tree. The fungus is currently a reportable, actionable pest. Postentry quarantine status applies to plants being grown for fruit production **only**.

References

1. Thorpe et al., 2005.
2. CABI, 2007.
3. Isla & Ravelo, 1989.
4. 7 CFR 319.37-7(b).

Ceratocystis mangicola (Sordariomycetes: Microascales)

November 22, 2011

Hosts

Mangifera indica (mango)

Distribution

Brazil

Symptoms

Symptoms of mango blight including wilting of stems, leaves, and flowers

Notes

Associated with the wood-boring beetle *Hypocryphalus mangiferae* (Coleoptera: Curculionidae). Little information is available regarding the host range and distribution. *Ceratocystis mangicola* (Sordariomycetes: Microascales) is listed as reportable in the PEST ID database.

Reference

Van Wyk, M, BD Wingfield, AO Al-Adawi, CJ Rossetto, MF Ito, & MJ Wingfield. 2011. Two new *Ceratoystis* species associated with mango disease in Brazil. *Mycotaxon* 117(1):381–404.

Ceratocystis mangivora (Sordariomycetes: Microascales)

November 22, 2011

Hosts

Mangifera indica (mango)

Distribution

Brazil

Symptoms
Symptoms of mango blight including wilting of stems, leaves, and flowers

Notes
Associated with the wood-boring beetle *Hypocryphalus mangiferae* (Coleoptera: Curculionidae). Little information is available regarding the host range and distribution. *Ceratocystis mangivora* (Sordariomycetes: Microascales) is listed as reportable in the PEST ID database.

Reference
Van Wyk, M, BD Wingfield, AO Al-Adawi, CJ Rossetto, MF Ito, & MJ Wingfield. 2011. Two new *Ceratoystis* species associated with mango disease in Brazil. *Mycotaxon* 117(1):381–404.

Fusarium sterilihyphosum (Federal Quarantine Significant)

Causal Organism
Fusarium sterilihyphosum

Synonyms
Mango malformation disease (MMD)

Hosts
Mangifera indica

Distribution
Southern Senegal (Kolda, Sedhion, and Ziguinchor regions), Egypt, and South Africa

Symptoms
Disease characterized by malformation of flowers that prevent fruit from setting by transforming flowers into leaves as well as malformation on seedlings and even on big trees, causing distortion of the apical buds and mummification.

Transmission
The disease is normally spread over long distances by infected seedlings or grafting buds. Locally, infested parts spread the disease to the entire tree or orchard. Flowers, seedlings, branches, and leaves and older trees show symptoms of MMD where fungus develops spores (a primary source of infection) especially during the rainy season. Spores are spread by mango mites or by the wind to infect other trees and orchards.

Notes

There are two additional identified fungus species known to cause MMD: *F. mangiferae* and *F. subglutinans*. There is also another species that has **never** been identified and reported, but is similar to *F. sterilihyphosum* in outward appearance. Research is being conducted to identify this new species. *F. mangiferae* is reportable/actionable pending APHIS evaluation of implementing official control with input from the National Plant Health Board. Commonwealth regulatory issues may exist. *F. subglutinans* (teleomorph: *Gibberella subglutinans*) is non-quarantine significant.

Within three years MMD could reportedly cause losses of up to 98% of mango production in Senegal, **not** to mention the probability of affecting the West African region which is already under attack of fruit fly species such as: *Bactrocera invadens*, *B. cucurbite*, *Ceratitis cosyra*, and *C. capitata*.

References

1. International Institute of Tropical Agriculture (IITA)
2. U.S. Department of Agriculture (USDA)
3. International Plant Diagnostic Network (IPDN)
4. Agricultural Services and Producer Organizations Program (PSAOP)
5. Dr. Lamine Senghor, Laboratory of Plant Pathology at the Ministry of Agriculture’s Direction de la Protection des Vegetaux (Crop Protection Directorate (DPV)

Fusarium tupiense (Sordariomycetes: Hypocreales)

July 2012

Causal Organism

Fusarium tupiense (Sordariomycetes: Hypocreales)

Symptoms

Mango malformation disease including vegetative parts and flowers

Distribution

Brazil

References

1. Lima, CS, LH Pfenning, SS Costa, LM de Abreu, and JF Leslie. 2012. *Fusarium tupiense* sp. nov., a member of the *Gibberella fujikuroi* complex that causes mango malformation in Brazil. Mycologia DOI: 10.3852/12-052.

Pseudofusicoccum stromaticum (Dothideomycetes: Botryosphaeriales)

September 14, 2011

Causal Agent

Pseudofusicoccum stromaticum (Dothideomycetes: Botryosphaeriales)

Hosts

Mangifera indica (mango); *Eucalyptus* spp.; and *Acacia mangium* (black wattle)

Distribution

Brazil and Venezuela

Symptoms

Dieback

Notes

Pseudofusicoccum stromaticum (Dothideomycetes: Botryosphaeriales) is **not** known to occur in the United States.

References

Marques, MW, NB Lima, SJ Michereff, MPS Câmara, & CRB Souza. 2011. First report of mango dieback caused by *Pseudofusicoccum stromaticum* (Dothideomycetes: Botryosphaeriales) in Brazil. *Plant Disease* DOI: 10.1094/PDIS-05-11-0425.

Xanthomonas campestris pv. mangiferaeindicae

June 2011

Causal Organism

Xanthomonas campestris pv. mangeiferaeindicae (Gammaproteobacteria: Xanthomonadales)

Synonyms

X. citri pv. mangiferaeindicae

Host

Mangifera indica (mango) and *Anacardium occidentale* (cashew)

Notes

Xanthomonas campestris pv. mangeiferaeindicae is an economically important pathogen of mango and *Anacardium occidentale* (cashew) and is reportable in the PEST ID database

Symptoms

Raised, angular, black lesions

Distribution

Africa, Asia, Australia, Brazil, Burkina Faso, and New Zealand

References

1. Pruvost, O, C Boyer, K. Vital, C Verniere, L Gagnevin, and I Somda. 2011. First report in Burkina Faso of *Xanthomonas citri* pv. mangiferaeindicae causing bacterial canker on *Mangiera indica*. Plant Disease 95(10):1312.

Circular 33: Diseases of *Morus* spp.

Mulberry Rust (Federal Quarantine Significant)

Synonyms

Aecidium mori (Barclay) Dietel, *Caeoma mori* Barclay, *Peridiopsora mori* (Barclay) Sacc., *Uredo mori* (Barclay) K.V. Prasad

Hosts

Broussonetia spp. and *Morus* spp.

Distribution

Afghanistan, China, India, Indonesia, Japan, Korea, Myanmar (Burma), Pakistan, Philippines, Taiwan, Thailand, and Timor-Leste

Symptoms

Aecia. Located on both the upper and lower surface of the leaf. They can be solitary or in groups, sometimes densely clustered on leaves, buds, and branches, also on the veins and petioles. They can be in elongated clusters up to one centimeter long causing distortion and excessive host tissue growth. The aecia are cup shaped and deeply immersed in the plant tissue.

Description

Aecia. peridia are prominent, easily splitting vertically with the cells oblong to polygonal, 14 to 31 x 10 to 21 µm the inner wall 0.5 to 1 µm thick and verrucose. The outer wall is 3.5 µm thick, smooth to finely verrucose.

Aeciospores. angularly globose to ellipsoid, densely and minutely verrucose, hyaline to pale yellow. They are 11 to 20 x 9 to 17 µm with walls 1.5 µm thick.

Notes

Spermogonia, uredinia, and telia are unknown.

References

Hernandez, J.R. Invasive fungi. Aecidium mori. Sytematic Botany & Mycology Lab., ARS. USDA. http://nt.ars-grin.gov/sbmlweb/OnlineResources/FungiOnline.cfm (accessed October 12, 2005).

Mulberry Mosaic Agent (Federal Quarantine Significant)

Revised and restructured Feb. 1996

Synonyms

Mulberry Mosaic, Mulberry Virosis Virus, Mulberry Dwarf Phytoplasma, Mulberry Mosaic Agent

Hosts

Morus alba L., *Morus* spp.; possibly *Broussonetia papyrifera* (L.) Vent.

Distribution

China, India, Japan, Korea, Thailand, and former Soviet Union

Symptoms

Chlorotic patches of various sizes and shapes are found on the leaves. Diseased leaves are very much puckered and become papery. Malformation of the leaves is also very characteristic of the disease particularly on the younger leaves. Tu (1932) adds that the plants may be stunted and the leaves mottled. Brierley (1944), crediting Endo and Kurasawa (1937), states that there may be enations on the under surface of the leaves and that rosetting and proliferation of lateral buds may occur. Intracellular bodies occur in epidermal and mesophyll cells.

Transmission

By grafting

References

1. Brierley, P. 1944. Viruses described primarily on ornamental or miscellaneous plants. P.D.R. Suppl. 150:145; 150; 184-85; 414; 436-37; 437; 448-49; 475.
2. Endo, Y. and T. Kurasawa. 1937. On a strange virosis of the mulberry tree (Japanese with English resume). Bull. Sericult. and Silk Indust., Uyeda 9:115-32.
3. Ho, W.T.H. and L.Y. Li. 1936. Mosaic disease of mulberry (Morus alba L.). in: Preliminary note on the virus diseases of some economic plants in Kwangtung Province. Lingnan Sci. J. (China) 15:73-74.
4. Tu, C. 1932. Mulberry (Morus alba L.). In notes on diseases of economic plants in South China. Lingnan Sci. J. 11:496-97.
5. CFR 319.37§2.

Circular 34: Diseases of *Olea* spp.

Olive Latent Ringspot Virus

This virus is naturally occurring and produces no symptoms in *Olea*. It has been reported from Italy. The virus particle is a sphere of about 28 nm in diameter. The virus was experimentally transmitted by sap inoculation to seven species of common virus indicators. Infection can be determined **only** by virus indexing.

NOTICE
Additional symptomless infections of *Olea* are caused by the viruses Arabis Mosaic, Cherry Leaf Roll, and Strawberry Latent Ringspot.

References

Gallitelli, D. et al. 1985. Olive latent ringspot virus. AAB descriptions of plant viruses #301. AAB, Wellesbourne, Warwick, England.

Olive Partial Paralysis Virus

Revised and restructured Mar. 1996

Synonyms

None

Hosts

Olea europaea L., *Ligustrum sinense* Lour.

Distribution

Argentina

Symptoms

The disease known as "partial paralysis" of olive was reported by Nicolini and Traversi (1950) to be of serious concern to olive growers in Argentina.

The first symptoms observed on young plants consist of chlorotic, curled leaves on secondary twigs to which they remain adhering on desiccation. Later the entire branch shrivels from the tip downward. A dark reddish-purple band appears on the bark. Later, other branches manifest this same condition and the plant ultimately dies.

Leaf tips often show a yellow bronzing spreading toward the middle, which terminated abruptly, leaving the rest of the leaf apparently normal. The necrotic area remains firmly attached. Many leaves, especially of the new buds, show a mosaic pattern with darkening of the midrib.

Symptoms vary from year to year depending on growing and climatic conditions. Under favorable conditions, diseased trees appear to recover.

Sections of twigs from diseased plants have a strong fermentation odor. Many rootlets are decayed. Internally there is a progressive disorganization of the cambium and phloem. The thin cambium zone increases in width due to the rapid multiplication of cells. Disorganization of the cambium ensues and may extend, in severe cases, as far as the secondary xylem, which becomes chestnut to nearly black in color. Heavy starch deposits may be found in the palisade and spongy tissues of leaves. The number of chloroplasts is reduced. Malformations are confined to the young cells.

A very similar disease, Progressive Decline of Olive, is reported from Italy by Biraghi and Naldi (1948). It has **not** been proven that the disease is caused by a virus.

Transmission

The virus was transmitted to privet (*Ligustrum sinens*e) by grafting buds or scions.

References

1. Biraghi, A. and N. Naldi. 1948. Ulterior notizie all deperimento progressivo dell'Olivo (Further notes on the progressive decline of the olive). Olivicoltura 3(10):3-5.
2. Nicolini, J.C. and B.A. Traversi. 1950. Observaciones sobre una neuva enfermedad del Oliva en la Argentina (Observations on a new Olive disease in Argentina). Inf. Direcc. Invest. Agric. B. Aires, 3(32):6.

Olive Sickle Leaf Virus

The disease, in a severe form, could be a threat to the olive industry in the United States.

What appears to be the same disease has been reported in Chile, Italy, Greece, Portugal, the United States (CA), and possibly Israel.

Ciferri et al. (1953), McCartney (1973), and Thomas (1958) describe various malformations of olive leaves. The various symptoms include leaves that are sickle-shaped, chlorotic, deformed, blotched, streaked, curved, puckered, and are light-green in color with white markings.

Affected branches may be stunted and the amount of the fruit reduced. The disease appears in individual branches. Diseased plants are bushy in appearance.

References

1. Ciferri, R. et al. 1953. Anomalie fogliari dell'olivo Ligure e Gardesano. Ann. Sper. Agr. NS 7(6):1957-76.
2. McCartney, W.O. 1973. Olive sickle leaf virus found in “dwarfing manzanillo” from Israel. Phytopath. 63: 1216 (abs.).
3. Thomas, H.E. 1958. Sickle leaf of olive. P.D.R. 42:1154.

Circular 35: Diseases of *Passiflora* spp.

Cucumber Mosaic Virus

Synonyms

Marmor passiflorae Holmes., Passionfruit Woodiness Virus, *Passiflora* Virus 1 (Noble) K.M. Smith, Passionfruit Bullet Disease Virus

Hosts

Passiflora caerulea L., *P. edulis* Sims., alba Link and Otto., *P. foetida* L., *P. suberosa* L. and *P. subpeltata* Ort. (P. Alba)

Distribution

On Passiflora in Australia (New South Wales and Victoria), Kenya, New Zealand, and USA (CA). The distribution on other hosts is very widespread.

Symptoms

The symptoms are most pronounced in the cooler months, sometimes disappearing in the summer. The whole plant or **only** individual branches may be affected. The first symptom is downward curling of the terminal leaves. This is followed by light-colored spotting or vein clearing of the young leaves. Cleared areas along the veins increase in width until leaves or portions of them become chlorotic. Small, irregular or circular islands of dark-green are sometimes present on such leaves. In subsequent years, symptoms are **not** so conspicuous, but young leaves show distortion and savoying. Scattered light-colored areas or vein clearing may also be present. Older leaves are crinkled, misshapen, and smaller than normal. Plants are stunted. According to Smith (1972), the stems, particularly in the region of the terminal shoots, may develop mottled dark-green areas that strongly contrast with the normal green of the stems.

The fruits of infected plants are smaller than normal, malformed, and the surface may be roughened and cracked. In contrast to the somewhat ovate normal fruit, they tend to be spherical, hence the name, Bullet Disease. They are hard when cut and sections of the rind are found to be thickened and woody. The contents are either dry or the pulp is reduced and insipid.

It is unlikely that fruits will be found on the plants in detention; therefore, the stem and leaf symptoms will be the most useful.

NOTICE

Although Cucumber Mosaic Virus is present in California on *Passiflora* and on other hosts in other states, its destructive nature on *Passiflora* would destroy the usefulness of infected plants for all ordinary purposes.

References

1. Chamberlain, E.E. 1954. Plant virus diseases in New Zealand. Bul. 108. N.Z. Dept. Sci. and Industrial Res. 196-98.
2. Noble, R.J. 1939. Aphid vectors of the virus of woodiness or bullet disease in passion-fruit (Passiflora edulis Timns). Proc. Roy. Soc. N.S.W. 72:293-317.
3. Smith, K.M. 1972. A textbook of plant virus diseases. New York:Academic Press. 25-27; 121-27; 149.
4. Teakle, D.S. et al. 1963. Cucumber mosaic virus in Passiflora in California. P.D.R. Suppl. 47:677-78.

Passion Fruit (*Passiflora*) Mosaic Virus

NOTICE

This diseases is **not** known to be present in the United States.

Synonyms

None. However, this disease was confused with Passionfruit Woodiness Virus and discussed under that name by workers in Queensland, Australia.

Hosts

Systemic hosts: *Passiflora edulis* fsp. *flavicarpa* O. Deg., *P. incarnata* L., *P. mollissima* (HBK) Bailey

Local lesion hosts: *Beta vulgaris* L., *Chenopodium album* L., *C. amaranticolor* Coste & Reyn., *Vigna (sinensis) unguiculata* (L.) Walp.

Distribution

Nigeria and Australia (Queensland)

Symptoms

The symptoms are similar to those of Cucumber Mosaic Virus on *Passiflora* spp. Martini (1962) states that leaf mottling is the **only** reliable symptom. This seems to overlook the fruit symptoms.

Notes

The two diseases can be distinguished, according to Martini (1962), by indexing to various host plants. Passionfruit Mosaic Virus is systemic **only** in *Passiflora*, and also by the size and shape of the purified virus particles. **Neither** of these tests can be used in the field. Therefore, the practice should be to destroy plants if found showing these symptoms. If plants imported for scientific purposes should be involved, the case should be referred to the Postentry Quarantine Unit for consideration.

NOTICE

Although Cucumber Mosaic Virus is present in California on *Passiflora* and on other hosts in other States, its destructive nature on *Passiflora* would destroy the usefulness of infected plants for all ordinary purposes.

References

Martini, C.K. 1962. Some properties of the virus causing “woodiness” of passion fruit in Western Nigeria. Ann. Appl. Biol. 50:163-68.

Passion Fruit (*Passiflora*) Woodiness Virus

Revised and restructured Feb. 1996

Hosts

Passiflora edulis Sims., *P. edulis* fsp. *flavicarpa* O. Deg., *P. suberosa* L., *Arachis hypogea* L., *Centrosema pubescens* Benth., *Crotalaria (usaramoensis)*, *Zanzibarica* Benth., *Glycine max* (L.) Merr. and Macroptilium *(Phaseolus) atropurpureus* (Mocino & Sesse ex DC.) Urban

Distribution

Australia (Queensland, New South Wales, and Western Australia) and Surinam

Symptoms

Causes mosaic, ringspots, rugosity and leaf distortion of *P. edulis*. The fruits are frequently distorted and the pericarp hard and thick. The productive life of the plants is greatly decreased. *P. suberosa* is a much more tolerant host.

Description

Virus particles are flexuous rods about 750 x 12 nm.

Transmission

By sap and grafting.

Vectors

In a nonpersistent manner by the aphids *Myzus persicae* (Taylor) and *Aphis gossypii* (Greber).

Notes

Both Passionfruit Woodiness Virus and Cucumber Mosaic Virus (description following) cause leaf mosaic and woody fruit symptoms. Electron microscopy can differentiate between the two since Passionfruit Woodiness Virus is a flexuous rod and Cucumber Mosaic Virus is a spherical particle. However, infection by both can occur. To determine if this has happened, inoculating and reading the resulting symptoms on diagnostic hosts can confirm or deny this occurrence.

References

Taylor, R.H. and R.S. Greber. 1973. Passionfruit woodiness virus. CMI descriptions of plant viruses #122. CAB/CMI, Kew, Surrey, England.

Circular 36: Diseases of *Philadelphus* spp.

Elm Mottle Virus (Federal Quarantine Significant)

In progress.

Circular 37: Diseases of *Picea* spp.

Rhododendron-Spruce Needle Rust *Chrysomyxa ledi* (Alb. & Schw.) by var. *rhododendri* (DC) Savile (Federal Quarantine Significant)

In progress.

Spruce (Picea) Needle (Cushion) Rust

Revised Jun. 1964; restructured Mar. 1996

Causal Organism

Chrysomyxa abietis (Wallr.) Unger

Synonyms

Barclayella deformans Diet., *C. deformans* Jacz. (3) (see notes), *Blennoria abietis* Wallr., *Sphaeria navicularis* Wallr., *Caeoma piceum* Hartig, *Uredo epidermoidalis* Hartig

Hosts

Picea abies (L.) Karst, (*P. excelsa*) Link., *P. pungens* Engelm., *P. engelmannii* Parry ex Engelm., *P. jezoensis* var. *hondoensis* (Mayr) Rehd. *P. rubens* Sarg. (P. rubra), *P. sitchensis* (Bong) Carr., *P. smithiana* (Wallich) Boiss., *P. jezoersis* Maxim

Distribution

Austria, Belgium, Bulgaria, Czech Republic, Denmark, France, Finland, Great Britain, Germany, Hungary, Japan, Norway, Russia, Slovakia, Sweden, Switzerland, and once found in the United States in Louisville, Kentucky where spruce and fir **do not** occur naturally.

Symptoms

The following description is taken chiefly from Sorauer's (1932) account. On the needles of the current year's growth there appears, by the end of June, at first dull, but later, bright-colored, cross bands. (Some authors say that the cross bands, or spots, are brown at first.) The infected tissue stands out in strong contrast with the healthy tissue, bright yellow against green. In May of the second year, the fungus matures and two orange-red sori develop parallel to each other, but slightly separated. The sori break through the epidermis of the host as they ripen, exposing the spores that are soon scattered. The yellow-spotted needles then wither and fall.

Description

The fungus telial sori linear, in rows, waxy, yellowish-red, seated in yellow spots; teliospores cylindric, above slightly thickened (clavate), often branched, sometimes simple, up to 100 mm long by 9 to 12 µm wide, up to 12 cells, wall hyaline, contents yellowish-red in color; basidiospores globose, 4 to 6 µm in diameter, golden-red in color. The above description is according to Saccardo (1888). The description found in Sydow's monograph of the *Urediniales* (1923) gives a slightly different account. A free translation follows. *Telial sori* on the lower side of the leaf, seated on yellow or yellowish-red spots, elongate,. 5 to 10 µm long .3 to .5 µm wide, and .5 µm high, golden to reddish brown in color; teliospores in chains reaching 70 to 100 µm long, oblong, smooth, 20 to 3 x 10 to 15 µm, wall hyaline, 1 µm thick.

NOTICE

Despite its name, this rust is predominately a disease of *Picea* (spruce) rather than *Abies* (fir). No alternate host is known. In addition to the record of its presence in Louisville, KY, there is a doubtful record that it was present on *Abies canadensis* (*Picea candensis* BSP) in Essex County, MA, in 1883. (Weir 1923).

References

1. Anonymous. 1943. Rust disease of Norway Spruce. Gdnr's Chron. Ser. 3(113):127.

2. Hiratsuka, N. 1937. Miscellaneous notes on the East-Asiatic Urediniales with special reference to the Japanese species I, II, III. J. Jap. Bot. 13:244-51; 587-94; 1938. 14:33-38.
3. Jaczewski, A.A. 1926. A rare rust fungus, Chrysomyxa (Barclayella) deformans Jacz. Bull. Leningrad Forestry Inst. 133(l):131-49.
4. Saccardo, P.A. 1888. Sylloge Fungorum. 1:470; 7:598; 7:739; 24:754; 25:713-14; 25:762. Ann Arbor, MI: V.W. Edwards (reprinted 1944).
5. Sorauer, P. 1932. Handbuch der pflanzenkrankheiten. 3:90; 107-08. Berlin.
6. Sydow, P. and H. Sydow. 1923–1924. Monographia Uredinearum seu specierum omnium ad hunc usque diem cognitarum descriptio et adumbratio systematica. Vol. IV. 521 Leipzig, Germany:Borntraeger Bros.
7. Weir, J.R. 1923. The genus Chrysomyxa. Mycologia 15:184.

Circular 38: Diseases of *Pinus* spp.

Hemicycliophora dhanachandi (Hemicycliophoridae)

December 2010

Species

Nematode

Synonym

H. dhanachandi

Host

Pinus roxburghii (chir pine); but little information is currently available regarding further host range

Distribution

India; but little information is currently known about further distribution

Notes

New nematode species isolated from soil around the roots of *Pinus roxburghii* (chir pine) plants in India. Nematodes in the genus *Hemicycliophora* feed on a wide range of plant species, damaging roots, and reducing plant growth. It is listed as reportable in the PEST ID database.

References

1. Victoria, LN, N Mohilal, and RK Gambhir. 2010. A new species of Hemicycliophora (nematoda: Tylenchida) from pine forest of Manipur, India. *Indian Journal of Nematology* 40(2):162-166.

Scotch Pine Blister Rust (Federal Quarantine Significant)

Revised and restructured Feb. 1996

Causal Organism

Cronartium flaccidum (Alb. & Schw.) Wint.

Synonyms

Cronartium asclepiadeum (Willd.) Fries[1], *Peridermium cornui* Rostr. & Kleb. *P. pini* var. *carticola*., *Aecidium paeoniae* Wallr., *Uredo paeoniae* Cast

Hosts

Aecial. *Pinus sylvestris* L., *P. mugo* Turra., *P. pinaster* Ait., *P. tabuliformis* var. *Yunnanesis*

Imported uredial and telial hosts of this rust are **not** considered as a likely means of introducing the disease since this particular species of *Cronartium* is **not** systemic on these hosts. Furthermore, these plants, when brought into this country, usually arrive as seeds or nonfoliated dormant plant parts, and for that reason, represent a negligible risk. However, those same plants, when growing in this country, could serve as indicators of the presence of the rust that might have been introduced on pines by accident. For that reason, it is suggested that inspectors look for rusts on the following genera on the chance that the genera might sometime collect *C. flaccidum*.

Uredial and Telial. *Blumenbachia*, *Cynanchum*, *Impatiens*, *Loasa*, *Melampyrum*, *Nemesia*, *Paeonia*, *Pedicularis*, *Ruellia*, *Schizanthus*, *Scyphanthus*, *Tropaeolum*, *Verbena*, *Vincetoxicum* (esp. *V. officinale*)

Distribution

Europe and Asia

1 Klebahn (1938) maintains that the meager original description of *C. flaccidum* then becomes the valid binomial. Many European mycologists follow this reasoning. Approximately 25 names have been applied to this rust. Those **not** listed above can be found in Sydow's *Monographia Uredinearum* 3:560-63.

Symptoms

The following quotation is from Massee (1910). “The aecidia appear on bark of Scots fir, Pinus sylvestris, late in the spring, bursting through the outer dead cortex as irregular, inflated, pale yellow sacs, which open by an irregular crack and liberate the powdery, orange spores.” These “sacs” are from 2 to 6 mm long by 2 to 3 mm wide and high and are usually loosely aggregated on the branch, but may be evenly scattered. Description of the pathogen, *Cronartium flaccidum* (Alb. & Schwein.) Wint. (after Sydow).

Description

Pycnia irregular, yellow in color; aecia on branches, erumpent, large, 2 to 6 mm long by 2 to 3 mm wide and high, mostly loosely aggregated, but may be rather evenly scattered over a large part of a branch, peridium white of 2 or 3 layers of cells, the outer layer of small cells, the inner layers of large warty cells, mostly without rigid hairs; peridial cells rhomboid-ellipsoid up to 80 µm long by 18 to 38 µm wide, warty, membrane 4 to 6 µm thick; aeciospores globose-ellipsoid or polyhedrical, verrucose, 22 to 36 x 16 to 24 µm; wall hyaline, 3 to 4 µm thick.

On uredial and telial hosts the uredial sori sparse or aggregated, punctiform .15 to .25 mm in diameter, at last opening by a round pore, wall thin composed of cells up to 25 µm long by 15 µm wide, membrane cellular of almost uniform thickness (2 to 3 µm); uredospores ovate or ellipsoidal, loosely short echinulate, 18 to 30 x 14 to 20 µm, wall hyaline, 1.5 to 2.5 µm thick. The telial *sori hypophyllous*, sparse or aggregated, cylindrical, straight or curved, 1 to 2 µm long by 50 to 120 µm wide, yellowish-brown or reddish-brown in color; teliospores ellipsoid to oblong, smooth yellowish or yellowish-brown 20 to 60 x 10 to 16 µm, wall hyaline to golden, 1 1/2 µm thick, at the apex, slightly thicker.

References

1. Cummins, G.G. and L. Ling. 1950. An index of the plant rusts recorded in continental China and Manchuria. P.D.R. Suppl. 196-528.
2. Day, W.R. 1943. Forest pathology. Rept. Imp. For. Inst. Oxford 6-7. (RAM 23:200).
3. Klebahn, H. 1938. Open questions and new observations on the bark-inhabiting blister rusts of pines. (trans.) *Z. Pflkrankh*. 48:369-410. (RAM 18:73).
4. Liese, J. 1928. Die Rostpilzerkrankungen der Waldbaume. Mitt. Deutsch. Dendrol. Gesellsch. 40:158-75.
5. Massee, G. 1910. Diseases of cultivated plants and trees. London:Duckworth 320-21.

6. Mordue, J.E.M. and I.A.S. Gibson. 1978. *Cronartium flaccidum*. in: CMI descriptions of pathogenic fungi & bacteria #580. CAB/CMI. Kew, Surrey England.
7. Pape, H. 1938. Der Filzrost der Paonie. Blumenu. PflBau ver. Gartenwelt 42:269-70. (RAM 17:752).
8. Rennerfelt, E. 1943. On our present knowledge of the resin top fungus (peridermium) and its mode of dissemination and growth. Svenska Skogsvardsforen. Tidskr. 41:305-24. (RAM 25:373).
9. Saccardo, P.A. 1888. *Sylloge Fungorum*. 1:470; 7:598; 7:739; 24:754; 25:713-14; 25:762. Ann Arbor, MI: V.W. Edwards (reprinted 1944).
10. Sydow, P. and H. Sydow. 1904. *Monographia Uredinearum* seu specierum omnium ad hunc usque diem cognitarum descriptio et adumbratio systematica. Vol. I. Leipzig, Germany:Borntraeger Bros. 3:560-63.)

NOTICE

The description of *Melampsora pinitorqua* originally appearing in this circular has been deleted. It is now known that *M. pinitorqua* **does not** occur in Canada and the reports of its occurrence in British Columbia were based on collections of *M. medusae* (*M. albhertensis*). *M. medusae* occurs in the Northwestern United States on *Pseudotsuga menziesii* and *Populus tremujloides*.

Circular 39: Diseases of *Populus* spp.

Cytospora tritici (Soradariomycetes: Diaporthales)

May 17, 2012

Causal Organism

Fungus *Cytospora tritici* (Sordariomycetes: Diaporthales)

Synonyms

Originally described from *Triticum aestivum* (wheat) in Australia

Hosts

Populus spp. (poplar) trees

Distribution

China

Symptoms

Bark cankers and discolored sapwood

Notes
Not known to occur in the United States. The genus *Cytospora* is listed as reportable in the PEST ID database.

References
1. Punithalingam, E. 1980. New microfungi from cereals. *Nova Hedwigia* 32(2/3):586-606.
2. Zhang, QT, M. He, XY Zhang, Q Lu, & J Liang, 2012. Canker on bark of *Populus* spp. caused by *Cytospora tritici*, a new disease in China. *Plant Disease* DOI: 10.1094/PDIS-01-12-0040-PDN.

Poplar (*Populus*) Bacterial Canker (Federal Quarantine Significant)
Revised and restructured Jan. 1996

Causal Organisms
Xanthomonas populi (Ride) comb. nov.

Synonyms
Aplanobacter populi Ride, *Pseudomonas rimaefaciens* Konig, *P. syringae* fsp. *populae* Dowson (1957) and Gorlenko & Chumaevskaya (1959) still argue for *P. rimaefaciens*.

Hosts
Populus balsamifera L. (*P. Candicans*), *P. brabantica* Houtzagers, *P. trichocarpa* Torr. & Gray, and on some varieties of *P. monilifera* Ait., *P. nigra* L.

Distribution
Europe

Symptoms
(After Dowson 1957) This is a serious disease of poplar characterized by die-back and cankers accompanied by a slimy exudation containing bacteria and other organisms. Cankers varying from 1 to 15 cm long develop on the shoots, the branches, and sometimes, the trunk. In early summer many of the young shoots die back and, during wet weather, pearl-like drops of slime exude from the smaller cankers, from the base of dead buds, and from the internodes of the previous season's shoots.

As the buds open, some of the tender young leaves turn black, and later expanded leaves may exhibit blackened areas of varying extent. Small rents, cracks, and depressions develop in the epidermis in the vicinity of the exudate, the cortex beneath which is black. A red layer is always present in the wood of the affected shoots. Two types of cankers can be distinguished. The first,

developing in the current year of infection, takes the form of rough, knotted excrescences, varying in size from a pea to a walnut or more, referred to as closed cankers. The other type is a larger, 1-15 cm, elongated, perennial lesion with raised rim and exposed wood, is designated an open canker. Both types exude slime during wet weather in the spring.

Notes

Many fungi have been reported to cause cankers in Populus. In Europe, the most important of these according to Konig (4) are those caused by *Nectria* spp. In the Netherlands, particularly, *Nectria* is very commonly associated with *X. populi* in the same cankers. In France, this association is said to be rare. A canker of purely *Nectria* origin is said to be distinguishable by concentric zonation of the affected bark, by darker color in the first stages, and by the absence of the slimy exudate. *Nectria* cankers develop at a rapid rate in the winter months, while bacterial cankers grow little until spring.

References

1. Bergey, D.H. et al. 1948. Manual of determinative bacteriology. 6th ed. Baltimore:The Williams & Wilkins Co. 1187.
2. Dowson, W.J. 1957. Plant diseases due to bacteria. 2d ed. Cambridge:University Press.
3. Gorlenko, M.V. and M.A. Chumaevskaya. 1959. On species and interrelationships of some tumour-forming phytopathogenic bacteria (trans.) Nauch. Dokl. vyssh. Shkol. Biol. Sci. 135-36.
4. Koning, H.C. 1938. Bacterial canker of poplar. Chron. Bot. 4:11-12.
5. Koning, H.C. 1938. Bacterial canker of poplars. Meded. Phytopath. Lab. Willie Commelin Scholten. 14:3-42.
6. Ride, M. and S. Ride. 1978. Xanthomonas populi (Ride) comb. Nov. (Syn. Aplanobacter populi Ride), specificite, variabilite et absence de relations avec Erwinia cancerogena Ur. Eur. J. For. Path. 8:310-33.
7. CFR 319.37§2.

Circular 40: Diseases of *Prunus* spp.

European Rusty Mottle of Cherry (Federal Quarantine Significant)

June 3, 1963; restructured Mar. 1996

Synonyms
None

Hosts
Prunus spp. (cherry **only**)

Distribution
England, and probably other European countries

Symptoms
Symptoms first appear in July in England when groups of fine veins, tertiary or smaller, of mature leaves become yellow. The leaves gradually assume a dull green color in contrast to the bright green of the healthy leaves, and by the end of August, they have a yellowish-green appearance. Rusty red pigment develops on the leaf surface during August, usually, but **not** invariably, associated with the yellow veinlets. The amount of red coloration varies with the strain of the virus. **Neither** ring pattern, premature autumn yellowing, **nor** leaf-fall occurs. The shedding of yellowish-green mottled leaves with green rings in early summer, so characteristic of rusty mottle and mild rusty mottle in North America, **does not** occur.

Some virus strains have induced conspicuous dark red spotting and vein banding similar to red mottle in pear, while others have induced mainly yellow or pale rust colored pigmentation.

References
Posnette, A.F and R. Cropley. 1961. European rusty mottle disease of sweet cherry. Ann. Rept. East Malling Res. Sta. 85-86.

Plum Pox Virus (Federal Quarantine Significant)
Feb. 2000

Synonyms
Sharka

Hosts
All species of *Prunus* (almond, apricot, cherry, nectarine, peach, and plum) are natural hosts. *P. spinosum* is an important natural source of infection in Europe. Almost all the known apricot, peach, and plum cultivars are susceptible, but some remain symptomless when infected. There are six known strains of Plum Pox Virus (PPV).

Sixty additional host species in eight plant families were found to be possible hosts when experimentally inoculated.

Distribution

Most European countries, Chile, Egypt, India, Syria, and Turkey Recently reported in the United States (PA, MI, and NY)

Symptoms—Leaves

Apricot. Chlorotic, pale green lines, rings or spots develop on the leaves during the spring and can be observed until summer (Figure 10-38 on page 10-112).

Peach. Some chlorotic lines and small areas can develop on the leaves along the secondary and tertiary veins. These symptoms may be difficult to observe in the field (Figure 10-37 on page 10-112, Figure 10-40 on page 10-113, and Figure 10-41 on page 10-114).

Plum. Diffuse, pale green rings, lines or areas develop on the leaves in spring in some cultivars, they disappear in summer (Figure 10-39 on page 10-113).

This virus infects some wild and ornamental *Prunus* without symptoms. Symptoms on cherry are **not** common. Some varieties may flower during the quarantine period. Fruit symptoms are variable and since postentry plants should be released before fruit is produced, will **not** be discussed in this circular.

Transmission

Transmission occurs by grafting with infected budwood, and by 10 aphid species in a nonpersistent manner. The most efficient vectors are *Myzus persicae*, *Brachycaudus helichrysi*, *B. cardui*, and *Phorodon humuli*. Seed transmission has been reported for some strains of PPV in some hosts.

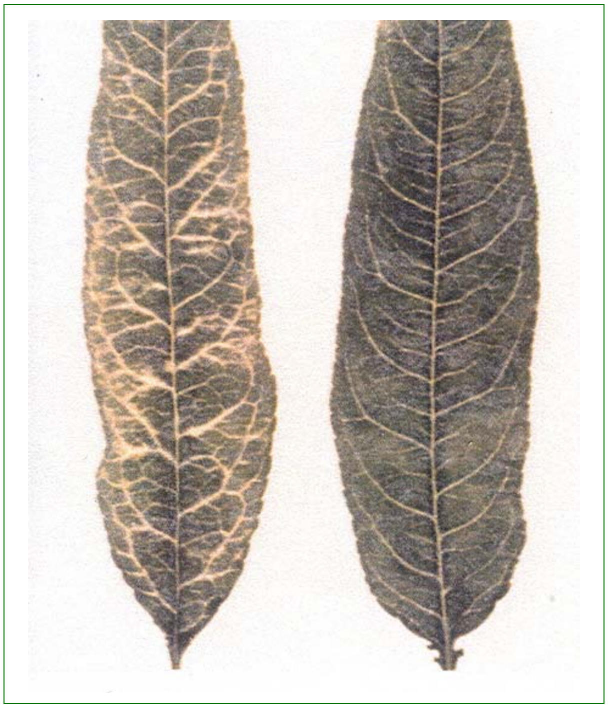


Figure 10-37 Peach leaves with Plum Pox Virus (PPV) showing vein clearing

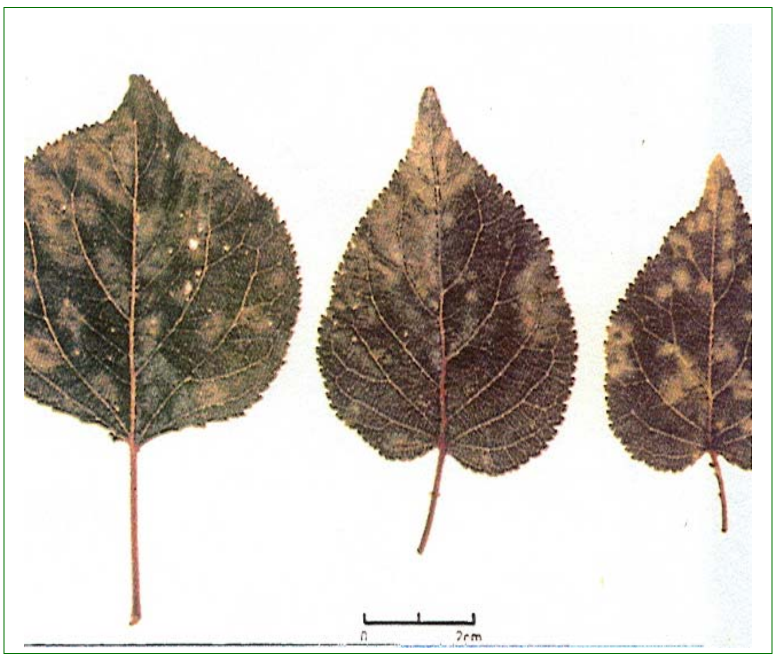


Figure 10-38 Apricot *Prunus* spp. with Plum Pox Virus (PPV)

Figure 10-39 Plum fruit with Plum Pox Virus (PPV); schematic drawing of symptoms on leaves and fruit

Figure 10-40 Example of Plum Pox Virus (PPV)-induced color breaking (pink flecks) in certain peach cultivars

Figure 10-41 Example of Plum Pox Virus (PPV)-induced color breaking (pink flecks) in certain peach cultivars

References

1. Desvignes, J.C. 1999. Virus diseases of fruit trees. Ctifl, France 202.
2. Diekmann, M. and C.A. Putter. 1996. Stone fruits. FAO technical guideline for safe movement of germplasm. No. 16 (with color photographs).
3. Dunez, J. 1987. Plum pox disease of stone-fruit trees. FAO bulletin. 1/R8080/mult/1.87/1/10000.
4. Kegler, H. and C. Schade. 1971. Plum pox virus. CMI Descriptions of Viruses. #70.
5. Nemeth, M. 1986. Virus, mycoplasma & rickettsia diseases of fruit trees. Boston:Martinus Nijhoff Publ. 840.
6. CFR 319.37.

Circular 41: Diseases of *Pseudolarix* spp.

- European Larch Canker (Federal Quarantine Significant) 10-76

Circular 42: Diseases of *Pseudostuga* spp.

- Douglas Fir Canker (Federal Quarantine Significant) 10-22

Circular 43: Diseases of *Punica* spp.

Bacterial Blight on Pomegranate

Synonyms
None

Causal organism
Xanthomonas axonopodis pv. *punicae*

Hosts
Punica granatum (pomegranate)

Distribution
India, Pakistan, and South Africa

Symptoms
Disease characteristics include leaf spots, branch, stem, and nodal cankers, and fruit blemishes. Pomegranate trees can die back above the parts on a branch or trunk girdled by the canker. Pomegranate production can be severely affected by high incidences of bacterial blight disease.

References
1. Exotic Pest Information Collection and Analysis (EPICA), posted 10/28/10.
2. Peterson, Y., Mansvelt, E..L., Venter, E., & Langenhove, W.E. 2010. Detection of *Xanthomonas axonopodis* pv. *punicae* causing bacterial blight on pomegranate in South Africa. Australasian Plant Pathology 39:544–546.

Xiphinema granatum (Longidoridae)
June 2012

Species
Nematode

Synonym
None

Host

Punica granatum (pomegranate) trees; but little information is currently available regarding further host range

Distribution

Iran; but little information is currently known about further distribution

Notes

New dagger nematode species isolated from soil around the roots of *Punica granatum* (pomegranate) trees in Iran. *Xiphinema* spp. can also vector nepoviruses. The genus *Xiphema* is listed as reportable in the PEST ID database.

References

Pedram, ME, E Pourjam, JE Palomares-Rius, R Ghaemi, C Cantalapiedra-Navarrete, & P Castillo. 2012. Molecular and morphological characterisation of *Xiphinema granatum* n. sp. and Longidorus pisi Edward, Misra & Singh, 1964 (Dorylaimida: Longidoridae) from Iran. *Nematology* DOI: 10.1163/156854112X638406.

Circular 44: Diseases of *Quercus* spp.

White Rot and an Undescribed Gall-Forming Rust (Federal Quarantine Significant)

Quercus was placed under Postentry regulations because of White rot caused by *Stereum hiugense*, and an Undescribed Gall-Forming Rust. The lack of recent reports regarding *S. hiugense* might signify the name is synonymous with one of the other *Stereum* spp.

Circular 45: Diseases of *Ribes* spp. (*Grossularia*)

Black-Currant Reversion Agent (Federal Quarantine Significant)

Synonyms

Ribes virus 1, *Acrogenus ribes* Holmes

Hosts

Ribes nigrum (European black currant)

Distribution

Europe and New Zealand

Symptoms

Leaves abnormally narrow and flat, generally smaller in surface area, but thicker and darker after early stages, small veins few, serrations of the leaf fewer and coarser. Wilson (1950) states that the “blossom symptoms can be distinguished in April. The buds of the infected bush are more highly colored than those of a healthy one, due to the absence of a dense mass of hairs, while the flowers which are carried on elongated stalks, appear transparent and more cylindrical than normal. The stigma protrudes above the anthers making pollination virtually impossible and what fruit does set usually drops.” Flowers and small fruits fall. Stems are less woody than normal with a tendency to excessive gum production.

It has been found that many of the symptoms develop so late in the disease cycle that they are of little use in the detection of the disease in the field. For this reason English workers rely on the following leaf symptoms in rouging the plantings. The description is slightly revised from that published by Lees (1935).

If any leaf be examined from the under surface it will be noticed that there are 5 main (primary) veins arising from one point at the extreme base of the leaf. Those veins run to the 5 main points (lobes) of the leaf. Now if the secondary veins arising from the midrib on one side and running to the points on the margin (**not** counting the secondary veins from the primary veins **other than** the midrib) be counted it will be found that they number at least 5 in a normal leaf. Sometimes there are 6 to 7 but **never** less than 5. In a definitely reverted leaf, however, they are less than 5, 3 being a common number in well-developed cases, and in extreme cases they may be reduced to zero.

The second character to observe is the margin. In normal leaves there are numerous fine serrations, many of which **do not** receive a secondary vein, but receive vein branches of a lower order. In reverted leaves the margin has comparatively few and coarse serrations and **only** a few fine serrations exist which receive veins of a lower order than secondary.

In applying the foregoing instructions Amos and Hatton (1) stipulate that all but the “one or more leafy vegetative shoots which have developed from buds formed in the previous year's wood” should be ignored. Leaves resembling reverted leaves may be found more or less commonly on the older wood. These may result from injury or in some situations appear to arise normally.

There is also a condition called “false reversion” which simulates the disease. In false reversion the basal leaves show the symptoms, later leaves approach or reach normal. In true reversion all leaves of a shoot are about equally affected.

An English Ministry of Agriculture leaflet has summarized inspection instruction briefly: If less than 5 secondary veins are present on each side of the main vein (midrib) in the central lobe of the leaf, the leaf is reverted if 5 or more, the leaf is probably normal.

If the margins (on both sides of the central lobe) are finely toothed, and if 4 to 8 of these teeth are **not** reached by a secondary vein, the leaf is almost certainly normal. If, however, this portion of the margin is coarsely-toothed, and if less than 4 of the teeth **do not** each receive a secondary vein, the leaf is reverted to some degree.

Transmission

By grafting. Reversion is **not** transmitted by expressed juice, **nor** through the soil, or through the seeds of infected plants.

Vector

The mite, *Cecidophyopsis ribis* (*Eriophyes ribis*). This is the mite which causes the condition known as big-bud. Big-bud and reversion, but **not** invariably, occur on the same plants.

References

1. Amos, J. and R.G. Hatton. 1926. Reversion of black currants: symptoms and diagnosis of the disease. J. Pom. & Hort. Sci. 6:167-83.
2. Dounin, M.S. and E.V. Shatova. 1936. Summary of the scientific research work of the institute of plant protection for the year 1936. Part III Virus and bacterial diseases of plants the biological, chemical, and mechanical methods of plant protection (trans.) State Publ. Off. Lit. Collect.
3. Gram, E. et al. 1928. Survey of the diseases of agricultural and horticultural cultivated plants in 1927. Tidsskr. for Planteavl. 34(5):778-836.
4. Holmes, F.O. 1939. A handbook of phytopathogenic viruses. Minneapolis. MN:Burgee Publishing Co. 51; 52; 112-13.
5. Holmes, F.O. 1948. in: Bergey’s Manual of determinative bacteriology 6th ed. Baltimore:The William & Wilkins Co. 1203.
6. Jorstad, I. 1942. Melding on plantesykdommer i land og hogebruket. Sykdommer po beervekstor. Oslo:Grondahl & Sons Boktykkeri 34.
7. Lees, A.H. 1935. Leaf character in reverted black currents. Ann. Appl. Biol. 9:44:68.

8. Lihnell, D. 1949. Virussjukdomer hos frukttradoch bervaxter. Sverig. pomel. Foren. Arsskr. 50:36-50 and Rev. Appl. Myc. 29:513.
9. Wilson, P. 1950. Blossom may give the first of black currant reversion. Small holder 83(2090):11.
10. CFR 319.37§2 (01-01-05).

Circular 46: Diseases of *Rosa* spp.

Cytospora rosarum (Sordariomycetes: Diaporthales)

December 01, 2011

Causal Agent

Cytospora rosarum (Sordariomycetes: Diaporthales)

Host

Rosa spp.

Symptoms

Twig, branch, and bark necrosis

Distribution

Armenia; Greece; India; Iran; Pakistan; Poland; Turkey; Ukraine; and United Kingdom

Notes

Cytospora rosarum (Sordariomycetes: Diaporthales) is **not** known to occur in the United States. The genera *Cytospora* and *Valsa* are listed as reportable in the PEST ID database.

Reference

Lyange, ER, C Eken, AD Spanbayev, & T Genc. 2011. First report of Cytospora rosarum on *Rosa canina* in Turkey. *Journal of Plant Pathology* 93(4S):4.80.

Rose Wilt Agent (Federal Quarantine Significant)

Synonym

Marmor flaccumfaciens

Time of Year to Inspect

Spring; up to six weeks after leaves are fully out

Symptoms

Plant. Is wilted. Dieback of young shoots can be seen. Young plants produce pinched, yellowish-green shoots. There may be proliferation of stems from a single bud producing a Witches' Broom effect. The shoots usually die during the year.

Leaf. Young petioles curve downward (epinasty), leaves are brittle and easily detached by wind or brushing with the hand. They often turn pale green or yellow in color before falling.

Stem. Dieback occurs in the stem. Some mature, but still soft stems may develop purple blotches that are often ring shaped. Scions are broad at the base and rapidly taper toward the tip.

Flowers. None

Transmission

Transmission occurs by grafting, mechanical, and/or insect (*Macrosiphum rosae*, *Aphidae*, in Australia).

Discussion

The rootstock of *Rosa multiflora* symptomless carrier of Rose Wilt Agent, consequently the varieties grafted on this rootstock should be inspected for Rose Wilt Agent symptoms. A disease named Rose Leaf Curl and similar to Rose Wilt Agent has been found in California. The agent is latent in antique roses and, therefore, such plants are symptomless. However, it incites symptoms in tea rose hybrids. As of this writing, there is no conclusive evidence that these diseases are caused by the same agent. For quarantine purposes, we presently consider them as distinct.

Distribution

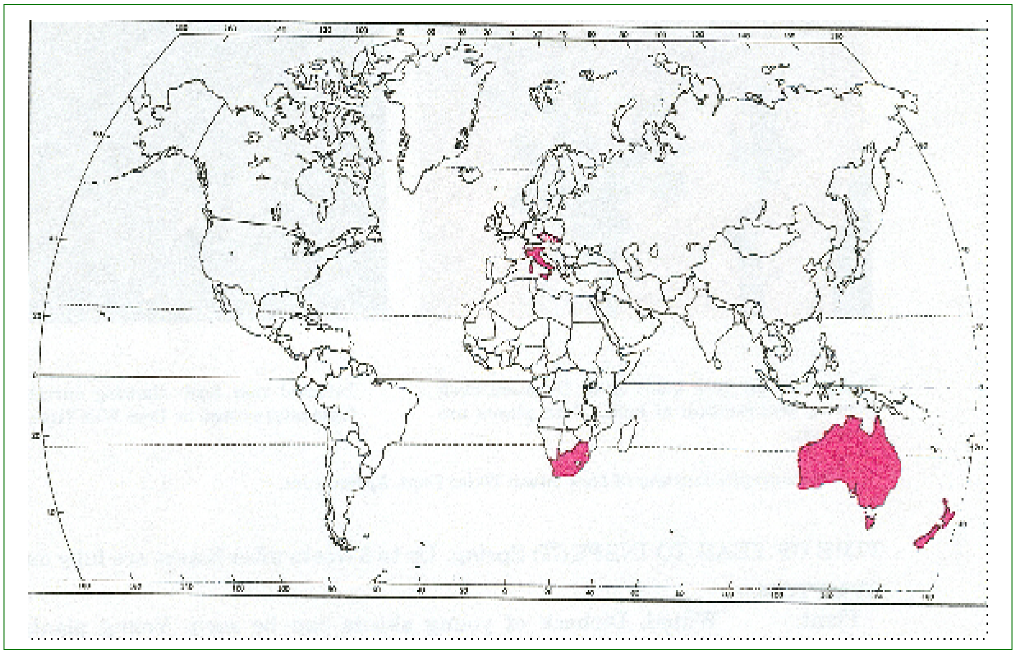


Figure 10-42 Distribution of Rose Wilt Agent; Australia (including Tasmania), New Zealand, Republic of South Africa; a similar disease occurs in Italy; for quarantine purposes, we will prohibit roses from these countries

References

1. Anonymous. 1969. Diseases of rose. N.S.W. Dept. Agric. Pl. Dis. Bull. 109:10-13
2. Anonymous. 1958. Rose wilt. Agric. Gaz. N.S.W. 69(11):592-94.
3. Fry, P.R. and K.R.W. Hammet. 1971. Rose wilt virus in New Zealand. N.Z.J. Agr. Res. 14(3):735-43.
4. Gigante, R. 1936. Una nuova virosi della rose in Italia. Boll. Staz. Pat. veg. Roma, N.S. 16:76-94.
5. Grieve, B.J. 1931. Rose wilt and dieback. A virus disease of roses occurring in Australia. Austral. J. Exp. Biol. & Med. Sci., 8:107-21.
6. Wade, G.C. 1955. Rose diseases in taxmania. Tasm. J. Agric. 26:135-41.

Circular 47: Diseases of *Rubus* spp.

Raspberry Leaf Blotch Virus (RLVB)

May 2012

Causal Agent
Emaravirus raspberry leaf blotch virus (RLBV)

Hosts
Rubus idaeus cv. Glen Ample (red raspberry) plants

Symptoms
Yellow leaf blotches and reduced yield

Vectors
Raspberry leaf and bud mite, *Phyllocoptes gracilis* (Acari: Eriophyidae)

Distribution
Finland, United Kingdom, and Serbia

References
Bi, Y., K Artola, T Kurokura, T Hytönen, & PT Valkonen. 2012. First report of raspberry leaf blotch virus in raspberries in Finland. *Plant Disease* DOI: 10.1094/PDIS-04-12-0368-PDN.

Rubus Stunt Phytoplasma (Federal Quarantine Significant)
Revised July 1991; restructured Mar. 1996

Synonyms
Witches' Broom, Heksenbezem, Dwergziekt, *Rubus Stauche*, Verzwergungs-Krankheit, ved "miny," dvergsjuke, Sheaf

Hosts
Rubus spp. This agent has been found in all the principal European raspberry varieties, and in many wild blackberry species. It can be experimentally transmitted to *Fragaria vesca* L. and several commercial strawberry varieties.

Distribution
Bulgaria, Czech Republic, Denmark, England, Germany, Netherlands, Norway, Poland, Slovakia, and former USSR

Symptoms
The disease is of great economic importance because of the severe crop losses that may occur when the disease becomes epidemic.

According to F.A. van der Meer and H.J. de Fluiter (1970) who studied the diseases in the Netherlands, the symptoms are basically alike in all species and varieties. Prentice (1950) states, however, that in raspberry, the symptoms depend to some extent on the variety infected.

Generally there are numerous small, thin, weak canes and excessive lateral branching of the whole plant, together with phyllody and proliferation of the flowers.

Prentice (1950) reports that in the season following the observance of weak canes, they generally fail to flower or produce very few flowers. Some varieties of raspberry have a tendency to produce a proportion of abnormal flowers. Sometimes the sepals are slightly longer than normal or the tips more leafy. According to Prentice (1950) and Putz (1969), in extreme cases, the sepals and carpels develop into leaves.

Prentice (1950) states that fruiting canes tend to have shortened internodes and often more than one bud develops at each node. Sometimes the development of axillary buds near the base of the cane help accentuate the bushy appearance of the plant. In early summer, leaves on infected canes are usually paler in color than normal.

In France, Putz (1969) reported symptoms of virescence on floral parts of "Malling Promise" similar to those of *Rubus* Stunt Phytoplasma, however, the virus has **not** yet been determined.

According to van der Meer and de Fluiter (1970), the variety "Malling Promise" is tolerant to some extent and on which phyllody is very rare. Other raspberry and blackberry varieties may regenerate to a high degree, consequently such regenerated plants generally **do not** show flower deformation.

Raspberry plants that are already badly affected by other viruses, such as Mosaic diseases, are more sensitive to *Rubus* Stunt Phytoplasma, and often die within a few years of infection.

Among the great number of shoots formed, some become larger than others and bear normal but small fruits that are difficult to harvest. Fruiting laterals of infected plants are always shorter than those of healthy plants.

In cultivated plantations, many diseased plants die in the shock stage of infection, because they are overgrown by healthy ones. However, raspberry plants grown from diseased root cuttings and planted distant from each other seldom die and may show a certain degree of regeneration.

On *Fragaria* vesca and commercial strawberry varieties, the virus causes Witches' Broom, phyllody of flowers, and severe growth reduction. Infected strawberry plants usually die within two or three years.

Transmission

The virus is transmitted by grafting. The incubation time for the virus to manifest itself is between 4 to 11 months depending on the season during which the plants are infected.

Vector

The vector is the leaf hopper, *Macropsis fuscula* Zett.

The vector has been reported from several European countries extending from Italy to Norway, Northern Russia, Canada (British Columbia), and United States (State of Washington, several counties).

There are two other probable vectors of the virus within the genus *Macropsis: M. brabantica* and *M. scotti*.

Source: USDA Handbook No. 631

Figure 10-43 First symptoms of Rubus stunt in red raspberry; numerous weak and erect shoots develop from the root buds

Source: USDA Handbook No. 631

Figure 10-44 Floricane of Rubus stunt-infected blackberry cv. "Thornless Evergreen," showing witches' broom growth and yellowing

Source: USDA Handbook No. 631

Figure 10-45 Phyllody of flowers of red raspberry cv. "Norfolk Giant" Sepals, petals, and pistils become leaflike structures; stamens usually remain normal

References

1. Anonymous. 1961. Plantesygdomme i Danmark1959. Arsoversigt samlet ved Statens plantepatologiske Forsog Lyngby 65:1-63. (Abstr. RAM 41:78-79).
2. Cadman, C.H. 1961. Raspberry viruses and virus diseases in Britain. Hort. Res. 1:47-61.3.
3. Converse, R.H. 1966. Diseases of raspberries and erect and trailing blackberries. Agr. Handbook 310:1-111.
4. Keldysh, M.A. 1967. Izrastanie malinyinfektsionnve zabolevanke (raspberry degeneration, an infectious disease). Biol. Nauki 10(7):111-17 (Abs. RAM 47:262).
5. Prentice, I.W. 1950. Rubus stunt. A virus disease. J. Hort. Sci. 26:35-42.
6. Putz, C. 1969. Les viroses des petit fruits l. Les viroses du fram boisier (Viruses of small fruit. l. The viruses of raspberries). Annls. Phytopath. 1:275-91.
7. Stance-Smith, R. 1968. Rubus viruses and virus diseases. Rev. Appl. Mycol. 47:97-109.

8. Trifonov, D. 1961. Malinov snop (sheaf of raspberry). Avoshtarstvo 8:25-26 (Abst. RAM 41:471).
9. van der Meer, F.A. and H.J. de Fluiter. 1970. Rubus stunt virus, University of California, Div. Agri. Sci., Berkeley, Cal. (handbook).

Circular 48: Diseases of *Salix* spp.

Virus Chlorosis

Synonyms
No synonyms are known.

Hosts
Salix alba L., *S. aurita* L., *S. babylonica* L., *S. caprea* L., *S. cinerea* L. (*S. aquatica*), *S. hybrid*, *S. pentandra* L., *S. triandra* (*S. amygdalina*), *S. viminalis* L.

Distribution
Czech Republic, Slovakia, and Hungary

Symptoms
The chlorosis (yellowing) occurs between the veins in the blade of the leaf. The leaves may be much reduced in size and drop prematurely. The whole tree may show weak growth, sometimes accompanied by an excessive production of small secondary branches on the shoots, a Witches' Broom effect.

Transmission
It has been transferred by grafting. The symptoms then appear in about 27 days. It can be transferred by sap inoculation but with difficulty. In this case, symptoms take much longer to become visible, about 61 days. An insect vector is believed to be involved in the natural spread of this disease because it may suddenly appear on previously healthy trees.

References
Svobodova, J. et al. 1962. Virova chloroza vrb (*Salix* spp.) Coskoslov. Akad. Zemedel. Ved. Sborn. Lesn. 35(5):343-50.

Watermark Disease (Federal Quarantine Significant)
Revised and restructured July 2005

Causal Organism
Erwinia salicis (Day) Chester

Synonyms

Bacterium salicis Day and *Brenneria salicis* (Day) Hauben et al.

In Holland, a disease of *Salix*, also called “Watermark” is said to be caused by *Pseudomonass saliciperda* (Lindeijer 1932). Lindeijer (1932) states that the symptoms appear to be identical with those of the disease reported in England and holds that the diseases are probably identical. Impure cultures may have caused the discrepancy. Recent English papers continue to use Day's name revised by Chester. With these reservations as to the correct taxonomy we can proceed in postentry work handling Watermark as if one disease is involved. If two, they are visually alike and equally harmful.

Hosts

Salix alba calva var. *calva* G.F. Mey., *S. alba* L., *S. purpurea* L., *S. X rubens* Shrank, *S. triandra* L. (*S. Amygdalina*), and *S. viminalis* L.

Distribution

Belgium, England, Germany, Japan, and The Netherlands

Symptoms

(After Dowson 1957) In England the first obvious sign of the disease is the sudden appearance of a bright red color of some of the leaves during hot weather in early summer. The foliage of whole branches may be affected in this way. Shortly afterwards, a bacteria-containing liquid drips in some quantity from the infected shoots. The reddened leaves soon turn brown and wither but **do not** fall. If infected shoots are cut across, a circular grayish discoloration is visible in the previous season's annual ring, but **not** in the current season's growth. This is the watermark that extends through the wood of the tree even into the roots. Adventitious shoots are produced numerously. These, being new wood, **do not** show the watermark when cut. Their presence is an indication of the disease. The “red leaf” branches are seldom killed and they die back, producing a “stag head” appearance of the trees.

In The Netherlands the first symptoms appear in May. The first leaves on a twig turn brown; subsequently the tip and the remaining leaves show signs of wilting. After one to several weeks, the neighboring twigs wither in their turn. Weather conditions largely influence the rapidity of this process.

As a rule, the sudden wilting may occur throughout the summer until September. Adventitious twigs may develop on the infected branches. In places on the infected twigs, exudations, consisting of a clear, sticky liquid that contains large masses of bacteria, may be found from May until the end of August. The color of infected twigs may fade.

The following internal symptoms are of even more importance to the plant quarantine worker who often sees **only** dormant plants or cuttings. On the freshly cut surface of a diseased twig a liquid mass soon gathers. A more or less large area of the wood has a water-soaked appearance. After having been exposed to the air, this wood turns brown. If a twig has been diseased for some time, the wood shows brown color directly when cut. When a twig is cut lengthwise the brown color appears as continuous streaks. Under the microscope, sections show the vessels swimming with bacteria. Tyloses and gum-like substances also occur in the vessels. Part of the medullary ray cells and the parenchyma cells are dead. No starch is found in the discolored wood. Infected trees are killed in one or two years.

Transmission

(The Netherlands) Observation and experiments indicate that the beetle *Cryptorrhynchus lapathi* L. is an important carrier of the disease.

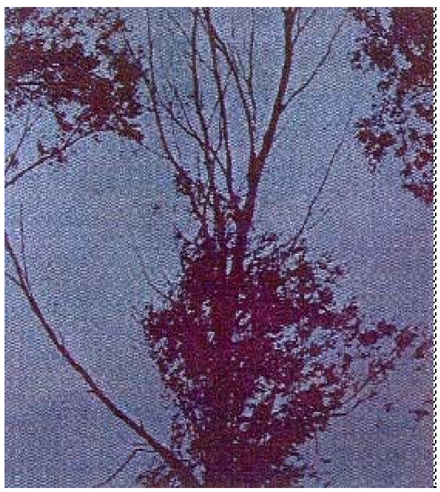


Figure 10-46 Watermark Disease of *Salix* spp.; typical die-back symptoms of this quarantine-significant disease caused by *Erwinia salicis*

References

1. Dowson, W.J. 1957. Plant diseases due to bacteria. 2d ed. Cambridge:University Press.
2. Lindeijer, E.J. 1932. De Bacterie-Ziekte Van Den Wilg Veroorzaakt Door Pseudomonas saliciperda n. spp. 8 illus., 82. (English summ.).
3. Spaulding, P. 1961. Foreign diseases of forest trees of the world. Agric. Handbook No. 197 USDA, Washington, D.C. 8-11.
4. CFR319.37§2.

Circular 49: Diseases of *Sorbus* spp.

Leaf Distortion

Causal Organism
Taphrina piri Kusano

Synonyms
Exoascus piri (Kusano) Sacc. & Trott

Hosts
Sorbus alnifolia (Siebold & Zucc.) *C. Koch* (*Micromeles alnifolia*), and *Pyrus miyabei* Sarg.

Distribution
Australia, China, Japan, New Zealand, Oceania, and The Philippines

Symptoms
The infected leaves of *S. ainifolia* show yellowish-green, circular or irregularly shaped leaf spots. The spots bear a pruinose, hoary-white growth on the surface when the fungus matures. This growth is composed of the closely crowded ascus cells of the fungus.

References
1. Kusano, S. 1905. Einige neue Taphrina Arten aus Japan. Ann. Myc. 3:31.
2. CFR 319.37§2.

Mountain Ash Variegation Agent (Federal Quarantine Significant)

Synonyms
Pyrus virus I (Baur) Smith, Infectious chlorosis (Baur 1907), Infectious chlorosis Hertzsch 1930, and *Pyrus* variegation virus (Atanasoff 1935)

Host
Sorbus aucuparia L. and *Pyrus aucuparia* Gaertn

Distribution
Czech Republic, Denmark, Germany, and Slovakia

Symptoms

The leaves of infected trees have, at first, yellow tips that later become white. In cases of severe infection, the leaves **do not** show well-defined yellow cones, but become mottled with yellow spots. On some leaves the yellow tissues are limited to the tips. In other cases, there is a clearing of the veins, or alternatively, a yellow band about 2 mm wide may run along the main veins. Chlorotic tissues gradually become white and finally brown.

The above description is that given by Smith (1972) who seems to have used it almost verbatim as written by Atanasoff (1935). Atanasoff's (1935) sources were Baur, Kranzlin, and Hertzsch (1907). Brierley (1944) has condensed the description to a sentence. "Yellow or white variegation, sometimes vein clearing and vein-banding (Smith 1972)."

Transmission

Transmission occurs by grafting. According to Baur (1907), a variegation **not** of virus origin also occurs on *Sorbus acuparia Dirkenii aurea*. This variegated variety has rather evenly colored yellowish-green older leaves, and young leaves of a pronounced yellow. As it was **not** transmitted by grafting, Baur concluded that it is a noninfectious variegation.

References

1. Atanasoff, D. 1935. Old and new virus diseases of trees and shrubs. Phytopath. Zeitschr. 8(2):212; 197-223.
2. Baur, E.et al. 1907. Uber eine infektiose Chlorosen bei Ligustrum, Laburnum, Fraxinus, Sorbus, and Ptelea. Bericht. d. Deutsch. Bot. Gesellsch. 25:410-13.
3. Brierley, P. 1944. Viruses described primarily on ornamental or miscellaneous plants. P.D.R. Suppl. 150:145; 150; 184-85; 414; 436-37; 437; 448-49; 475.
4. Smith, K.M. 1972. A textbook of plant virus diseases. New York:Academic Press. 25-27; 121-27; 149.
5. CFR 319.37§2.

Ringspot Mosaic of Sorbus

Synonyms

None

Hosts

Sorbus aucuparia L.

Distribution

Germany and possibly Finland

Symptoms

The symptoms appear regularly in the years following infection. The incubation time is about 10 months. They appear a few days after the leaves open as spot-like, light-green flecks on the pinnules. Later, they form a number of light-green spots, bands, or rings, the diameter of which is **only** a few millimeters. In this way, the leaves attain a distinct mottling or streaking. Often, additional light-brown, dark-bordered necrotic spots appear that occasionally become shot holes. The disease may at first be confined to a branch, but in later years spreads to other parts of the crown. Injury is **not** discussed, but the yellowing and mottling would affect the tree's value as an ornamental plant.

References

1. Jamalainen, E.A. 1957. Virustaudeista ja virustautien kaltaisista kasvitaudeista suomessa. Valtion Maatalouskoetoiminnan Julk. Nr. 158.
2. Kegler, H. 1959. Das ringfleckenmosaic der eberesche. Phytopath. Z. 37(2):214-16.

Circular 50: Diseases of *Syringa* spp.

- Elm Mottle Virus (Federal Quarantine Significant) 10-102

Circular 51: Diseases of *Ulmus* spp.

- Elm Mottle Virus (Federal Quarantine Significant) 10-102

Circular 52: Diseases of *Vaccinium* spp.

- *Diaporthe australafricana* (Sordariomycetes: Diaporthales) 10-132

Diaporthe australafricana (Sordariomycetes: Diaporthales)

March 7, 2012

Causal Agent

Diaporthe australafricana (Sordariomycetes: Diaporthales)

Hosts

Vaccinium corymbosum (blueberry) plants; *Vitis vinifera* (grape) plants

Symptoms

Exhibit brown to reddish necrotic stem cankers and shoot necrosis.

Distribution

Chile; South Africa; and Australia

Notes

Diaporthe australafricana (Sordariomycetes: Diaporthales) has been observed in Chile since 2006. It is **not** known to occur in the United States. The genus *Diaporthe* is listed as reportable in the PEST ID database.

References

Latorre, BA, E Elfar, JG Espinoza, R Torres, & GA Diaz. First report of *Diaporthe australafricana* associated with stem canker on blueberry symptoms in Chile. Plant Disease DOI: 10.1094/PDIS-12-11-1025-PDN.

Circular 53: Diseases of *Watsonia* spp.

- Gladiolus Rust (Federal Quarantine Significant) 10-38
- *Puccinia mccleanii* [Doidge] (Federal Quarantine Significant) 10-60
- *Uredo gladioli-buettneri* (Federal Quarantine Significant) 10-44
- *Uromyces gladioli* [Henn.] (Federal Quarantine Significant) 10-62

Circular 54: Diseases of *Ziziphus* spp.

- *Longidorus pisi* (Longidoridae) 10-133

Longidorus pisi (Longidoridae)

November 02, 2011

Species

Needle nematode

Hosts

Ziziphus jujuba (Chinese date); *Z. jujuba* var. *spinosa* (wild jujube); *Glycine max* (soybean); *Vitis vinifera* (grape); *Zea mays* (corn); *Oryza sativa* (rice); and *Pisum sativum* (pea)

Distribution

China; Cyprus; Africa; Pakistan; and India

Notes

Longidorus pisi (Longidoridae) was found in soil surrounding *Ziziphus jujuba* (Chinese date). It is **not** known to occur in the United States, and is listed as reportable in the PEST ID database.

Reference

Guo, K, H Shi, K Liu, & J Zheng. 2011. Past and present distribution and hosts of Longidorus (Nematoda: Dorylaimida) in mainland China. *Zootaxa* 3088:27–38.

Appendix A

Directory of PPQ Postentry Quarantine Liaison Officers

Contents

Introduction

The following list includes contact information for the PPQ Postentry Quarantine Liaison Officers (PEQLO) in both the Eastern and Western regions. Plant Inspection Stations (PIS) should use this list when determining who to contact and to whom PEQ forms and correspondence should be sent, i.e., PPQ Form 236 for the PPQ Liaison Officers. A list of State Plant Regulatory Officials and State PEQ Contacts can be found in Directory of SPROs and State PEQ Contacts on page C-1.

Listings

Table A-1 Directory of PEQ Liaison Officers (page 1 of 5)

State:	Contact:	Address:	Phone/FAX:
PEQP	Dave Farmer, National Coordinator (Thomas.D.Farmer@aphis.usda.gov)	USDA–APHIS–PHP–AQI 920 Main Campus Drive Suite 200 Raleigh, NC 27606	P: 919-855-7366 F: 919-855-7390
Alabama	Gregory T. Baldwin (gregory.t.baldwin@aphis.usda.gov)	USDA–APHIS–PPQ 334 Business Circle, Suite D Pelham, AL 35124	P: 205-663-9344 F: 205-663-2783
	Jeffrey Lasiter (jeffrey.t.lasiter@aphis.usda.gov)	USDA–APHIS–PPQ 3737 Government Blvd., Suite 517 Mobile, AL 36693	P: 251-661-2742 (mobile workstation) F: 251-661-4381
Alaska	*See* Washington on page A-6.		
Arizona	Joseph Simmons (joseph.l.simmons@aphis.usda.gov)	USDA–APHIS–PPQ 3640 E. Wier Ave. Phoenix, AZ 85040	P: 602-431-3200 F: 602-414-9870
Arkansas	Thomas Hill (thomas.e.hill@aphis.usda.gov)	USDA–APHIS–PPQ 1200 Cherry Brook Dr., Suite 100 Little Rock, AR 72211	P: 501-324-5258 F: 501-324-5230
California	Michael Meadows (Michael.E.Meadows@aphis.usda.gov)	USDA–APHIS–PPQ Plant Inspection Station 9777 Via de la Amistad, Room 140 San Diego, CA 92154	P: 619-661-3316 F: 619-661-3047
	Fengru Zhang (fengru.zhang@aphis.usda.gov)	USDA–APHIS–PPQ Plant Inspection Station 389 Oyster Point Blvd., Suite 2 South San Francisco, CA 94080	P: 650-876-9093 F: 650-876-9008
	Musa Abdelshife (musa.a.abdelshife@aphis.usda.gov)	USDA–APHIS–PPQ Plant Inspection Station 222 Kansas St. El Segundo, CA 90245	P: 310-955-3311 F: 310-955-3347
Colorado	Patrick McPherren (patrick.w.mcpherren@aphis.usda.gov)	USDA–APHIS–PPQ 3950 N. Lewiston St., Suite 330 Aurora, CO 80011	P: 303-371-3355 F: 303-371-4774

Table A-1 Directory of PEQ Liaison Officers (page 2 of 5)

State:	Contact:	Address:	Phone/FAX:
Common-wealth of the Northern Mari-ana Islands (CNMI)	*See* Guam on page A-3		
Connecticut	Charles Baker (charles.e.baker@aphis.usda.gov)	USDA–APHIS–PPQ 97 Barnes Road, Unit 200 Wallingford, CT 06492	P: 203-741-5656 F: 203-741-5660
Delaware	Colleen Kitzmiller (colleen.kitzmiller@aphis.usda.gov)	USDA–APHIS–PPQ 500 W. Loockerman St. #310 Dover, DE 19904	P: 302-678-5868 F: 302-734-7814
	Mark Johnston (mark.r.johnston@aphis.usda.gov)		P: 302-652-1642 F: 302-652-1645
District of Columbia	*See* Maryland on page A-4		
Florida	Metwaly H. Sheta (metwaly.h.sheta@aphis.usda.gov)	USDA–APHIS–PPQ Plant Inspection Station 3951 Centerport St. Orlando, FL 32827	P: 407-825-4237 F: 407-825-4235
	Leovaldo Castaneda (leovaldo.castaneda@aphis.usda.gov)	USDA–APHIS–PPQ Plant Inspection Station 3500 NW 62nd Ave. Miami, FL 33122 Mail: P.O. Box 660520 Miami, FL 33266	P: 305-526-3900 F: 305-871-4205
Georgia	Philip A. Bailey (philip.a.bailey@aphis.usda.gov)	USDA–APHIS–PPQ 1506 Klondike Rd., Suite 306 Conyers, GA 30094	P: 770-860-4025 F: 770-860-4050
Guam	Michael (Troy) Brown (michael.t.brown@aphis.usda.gov)	USDA–APHIS–PPQ 17-3306 Neptune Avenue Barrigada, GU 96913	P: 671-475-0854 F: 671-475-0853
Hawaii	Matthew Goo (matthew.y.goo@aphis.usda.gov)	USDA–APHIS–PPQ Honolulu International Airport 300 Rogers Blvd. #58 Honolulu, HI 96819	P: 808-834-3240 F: 808-861-8500
Idaho	Brian Marschman (brian.l.marschman@aphis.usda.gov)	USDA–APHIS–PPQ 9118 W. Blackeagle Dr. Boise, ID 83616	P: 208-373-1600
Illinois	Laura Ettema-Khan (laura.ettema.khan@aphis.usda.gov)	USDA–APHIS–PPQ 1817 South Neil St. Illinois Plaza, Suite 105 Champaign, IL 61820	P: 217-398-1698 F: 217-398-1732

Table A-1 Directory of PEQ Liaison Officers (page 3 of 5)

State:	Contact:	Address:	Phone/FAX:
Indiana	Gary W. Simon, SPH (gary.w.simon@aphis.usda.gov)	USDA–APHIS–PPQ 1305 Cumberland Ave. Suite 102 West Lafayette, IN 47906	P: 765-497-2859 F: 765-497-2879
	Tim Vawryk, PPQ Officer (timothy.s.vawryk@aphis.usda.gov)	USDA–APHIS–PPQ 131 East Court Ave. LL1 Jeffersonville, IN 47130	P: 812-282-6370 F: 312-282-6381
Iowa	VACANT—contact PEQ Coordinator		
Kansas	*See* Nebraska on page A-4		
Kentucky	Harold F. Hempfling (harold.hempfling@aphis.usda.gov)	USDA–APHIS–PPQ P.O. Box 475 Hebron, KY 41048	P: 859-689-2626 F: 859-689-2001
Louisiana	Terrence Marler (terrence.c.marler@aphis.usda.gov)	USDA–APHIS–PPQ 2500 Shreveport Hwy., Rm. 216 Pineville, LA 71360	P: 318-473-7133 F: 318-473-7103
Maine	Terry L. Bourgoin (terry.l.bourgoin@aphis.usda.gov)	USDA–APHIS–PPQ 15 Iron Rd., Suite 1 Hermon, ME 04401	P: 207-848-0001 C: 207-239-0498
Maryland	Matthew A. Travis, SPHD (matthew.a.travis@aphis.usda.gov)	USDA–APHIS–PPQ 2400 Broening Highway, Suite 102 Baltimore, MD 21224	P: 410-228-5541 F: 410-228-5542
Massachusetts	*See* Connecticut on page A-3		
Michigan	Gerald Wheeler (gerald.wheeler@aphis.usda.gov)	USDA–APHIS–PPQ 3260 Eagle Park Dr., Suite 119 Grand Rapids, MI 49525	P: 616-942-6225 F: 616-942-6235 C: 313-475-7907
Minnesota	Erin Stiers (erin.n.stiers@aphis.usda.gov)	USDA–APHIS–PPQ 900 American Blvd., East Nath Building, Suite 204 Bloomington, MN 55420	P: 952-814-1071 F: 952-814-1076 C: 612-616-2619
Mississippi	Miriam L. Allred (miriam.l.alfred@aphis.usda.gov)	USDA–APHIS–PPQ 2159 Henry Hill Dr., Suite 100B Jackson, MS 39204	P: 601-922-1417 F: 601-922-7648
Missouri	Larry Trevathan (larry.e.trevathan@aphis.usda.gov)	USDA–APHIS–PPQ 4300 Goodfellow Blvd., #102E St. Louis, MO 63120	P: 314-389-8420 F: 314-389-7640
Montana	Richard Merenz (richard.j.merenz@aphis.usda.gov)	USDA–APHIS–PPQ 1220 Cole Ave. Helena, MT 59601	P: 406-449-5210 F: 406-449-5212
Nebraska	Shayne Galford (shayne.p.galford@aphis.usda.gov)	USDA–APHIS–PPQ 5940 S. 58th St. Lincoln, NE 68516	P: 402-434-2345 F: 402-434-2330
Nevada	Alana Wild, (alana.l.wild@aphis.usda.gov)	USDA–APHIS–PPQ 8775 Technology Way Reno, NV 89521	P: 775-851-8818 C: 775-225-9935
New Hamp-shire	Stefan Windler (stefan.w.windler@aphis.usda.gov)	USDA–APHIS–PPQ 617 Comstock Rd., Suite 3 Berlin, VT 05602	P: 802-828-4545

Table A-1 Directory of PEQ Liaison Officers (page 4 of 5)

State:	Contact:	Address:	Phone/FAX:
New Jersey	H. Thomas James (thomas.james@aphis.usda.gov)	USDA–APHIS–PPQ 10 High St. P.O. Box 154 Mullica Hill, NJ 08062	P: 856-478-9740 F: 856-478-0128
New Mexico	Shawn Carson (shawn.r.carson@aphis.usda.gov) Robert Alexander (robert.w.alexander@aphis.usda.gov)	USDA–APHIS–PPQ 270 South 17th St. Las Cruces, NM 88005	P: 575-527-6985
New York	Barbara Hammerstone (barbara.j.hammerstone@aphis.usda.gov)	USDA–APHIS–PPQ 2044 Route 32, Suite 5 Modena, NY 12548	P: 845-883-6445 F: 845-883-6419
North Carolina	Sheena Goundie, PHSS (sheena.l.goundie@aphis.usda.gov)	USDA–APHIS–PPQ 1815 Gardner Dr. Wilmington, NC 28405	P: 910-815-4678 F: 910-815-4964
	William Torres, PHSS (william.o.torres@aphis.usda.gov)	USDA–APHIS–PPQ 1809-C Associates Ln. Charlotte, NC 28217	P: 704-424-1014 F: 704-357-1667
	Patrick DuBois, PHSS (patrick.r.dubois@aphis.usda.gov)	USDA–APHIS–PPQ 930 Main Campus Dr., #200 Raleigh, NC 27606	P: 919-855-7600 F: 919-835-0317
North Dakota	David Hirsch (david.c.hirsch@aphis.usda.gov)	USDA–APHIS–PPQ 3509 Miriam Ave., Suite A Bismarck, ND 58501	P: 701-250-4473 F: 701-250-4640
Ohio	John Michael Burch (john.m.burch@aphis.usda.gov)	USDA–APHIS–PPQ 8995 East Main St. Reynoldsburg, OH 43068	P: 614-322-4700 F: 614-322-4704
Oklahoma	Everett Dale (everett.dale@aphis.usda.gov)	USDA–APHIS–PPQ 301 N.W. 6th St., Suite 101 Oklahoma City, OK 73102	P: 405-609-8840 F: 405-609-8841
Oregon	Jinya (Jack) Qiu, Domestic Program Coordinator (jinya.j.qiu@aphis.usda.gov)	USDA–APHIS–PPQ 6135 NE 80th Ave., Suite A-5 Portland, OR 97218	P: 503-326-3814 ext. 232 F: 503-326-2969
Pennsylvania	Michele McDonald, PHSS (michele.l.mcdonald@aphis.usda.gov)	USDA–APHIS–PPQ 121 Locust St. Wrightsville, PA 17368	P: 717-574-2882 P: 215-768-4841
Puerto Rico	Contact PEQ Coordinator		
Rhode Island	*See* Connecticut on page A-3		
South Carolina	Marjorie Bestwick (marjorie.bestwick@aphis.usda.gov)	USDA–APHIS–PPQ 4600 Goer Drive, Suite 104 North Charleston, SC 29406	P: 843-480-4334
South Dakota	Amy Mesman (amy.mesman@aphis.usda.gov)	USDA–APHIS–PPQ 314 South Henry, Suite 200 P.O. Box 250 Pierre, SD 57501-0250	P: 605-224-1713 F: 605-224-0172
Tennessee	Paul Allyn (paul.d.allyn@aphis.usda.gov)	USDA–APHIS–PPQ 1410 Kensington Square Ct. Suite 101 Murfreesboro, TN 37130	P: 615-907-7804 F: 615-907-8168 C: 615-566-1204

Table A-1 Directory of PEQ Liaison Officers (page 5 of 5)

State:	Contact:	Address:	Phone/FAX:
Texas	Timothy Cunningham (timothy.d.cunningham@aphis.usda.gov)	USDA–APHIS–PPQ 903 San Jacinto Blvd., Suite 270 Austin, TX 78701	P: 512-916-5241 F: 512-916-5243
Utah	Gregory Abbott (gregory.c.abbott@aphis.usda.gov)	USDA–APHIS–PPQ 65 South 100 East Richfield, UT 84701	P: 435-896-4772 F: 435-896-8164
Vermont	Stefan Windler (stefan.w.windler@aphis.usda.gov)	USDA–APHIS–PPQ 617 Comstock Rd., Suite 3 Berlin, VT 05602	P: 802-828-4545
Virginia	Susan Murphy (susan.g.murphy@aphis.usda.gov) Dennis Heltzel (dennis.l.heltzel@aphis.usda.gov)	USDA–APHIS–PPQ 200 Granby Mall Federal Bldg., Rm. 331 Norfolk, VA 23510	P: 757-441-3211 F: 757-441-6267
Washington	Ayalew Assefaa (alew.assefa@aphis.usda.gov)	USDA–APHIS–PPQ 835 S.192nd St., Suite 1600 Seatac, WA 98148	P: 206-878-6600 F: 206-870-8043
West Virginia	Justin Thaxton (justin.b.thaxton@aphis.usda.gov)	USDA–APHIS–PPQ 1900 Kanawha Blvd., East Charleston, WV 25305	P: 304-343-8585 F: 304-343-8586
Wisconsin	JoAnn Cruse (joann.m.cruse@aphis.usda.gov)	USDA–APHIS–PPQ 1 Gifford Pinchot Dr. Building 1, Room 229 Madison, WI 53726	P: 608-286-3604 F: 608-231-9581
Wyoming	Larry Cain	USDA–APHIS–PPQ 504 West 17th St., Suite 200 Cheyenne, WY 82001-4348	P: 307-772-2323 F: 307-772-2780

Appendix

B

Plant Inspection Stations

Contents

Listings

Table B-1 Directory of Plant Inspection Stations (page 1 of 2)

Region:	Address:	Phone/FAX:
Eastern	USDA–APHIS–PPQ Plant Inspection Station P.O. Box 660520 Miami, FL 33266	Phone: 305-526-3900 FAX: 305-871-4205
	USDA–APHIS–PPQ Plant Inspection Station 3951 Centerport St. Orlando, FL 33122	Phone: 407-825-4237 FAX: 407-825-4235
	USDA–APHIS–PPQ Atlanta Plant Inspection Station 1220 Toffie Terrace Atlanta, GA 30354	Phone: 404-260-7830 FAX: 404-260-7832
	USDA–APHIS–PPQ Memorial Inspection Station 2500 Brunswick Ave., Bldg. G Linden, NJ 07036	Phone: 908-862-2012 FAX: 908-862-2095
	USDA–APHIS–PPQ Plant Inspection Station 230-59 International Airport Centers Blvd. Building C-Suite 100-Room 109 Jamaica, NY 11413	Phone: 718-553-3500 FAX: 718-553-3510
	USDA–APHIS–PPQ Plant Inspection Station 150 Central Sector, Bldg. C2, Warehouse #3 Carolina, PR 00979	Phone: 787-253-7850 FAX: 787-253-4514
Western	USDA–APHIS–PPQ Plant Inspection Station 9 North Grand Ave., Room 120 Nogales, AZ 85621	Phone: 520-287-6463 FAX: 520-397-0138
	USDA–APHIS–PPQ Plant Inspection Station 9777 Via de la Amistad, Rm. 140 San Diego, CA 92154	Phone: 619-661-3316 FAX: 619-661-3047

Table B-1 Directory of Plant Inspection Stations (page 2 of 2)

Region:	Address:	Phone/FAX:
Western	USDA–APHIS–PPQ Plant Inspection Station 389 Oyster Point Blvd., Suite 2 South San Francisco, CA 94080	Phone: 650-876-9093 FAX: 650-876-9008
	USDA–APHIS–PPQ Plant Inspection Station 222 Kansas St. El Segundo, CA 90245	Phone: 310-955-3258 FAX: 310-321-0035
	USDA–APHIS–PPQ Plant Inspection Station 17-3306 Neptune Avenue Barrigada, GU 96913	Phone: 671-475-1427 FAX: 671-477-9487
	USDA–APHIS–PPQ Plant Inspection Station 300 Rodgers Blvd., #58 Honolulu, HI 96819	Phone: 808-861-8492, 8494 FAX: 808-861-8499
	USDA–APHIS–PPQ Plant Inspection Station 900 E. Airline Hwy., Service Rd. A Kenner, LA 70063	Phone: 504-464-0430 FAX: 504-465-0968
	USDA–APHIS–PPQ Plant Inspection Station 19581 Lee Rd. Humble, TX 77338	Phone: 281-233-7100 FAX: 281-230-7223
	USDA–APHIS–PPQ Plant Inspection Station (Brownsville) P.O. Drawer 393 100 Los Indios Blvd. Los Indios, TX 78567	Phone: 956-399-2085 FAX: 956-399-4001
	USDA–APHIS–PPQ Plant Inspection Station 835 S. 192nd St., Suite 1600 SeaTac, WA 98148	Phone: 206-878-6600 FAX: 206-870-8043

Appendix

C

Directory of SPROs and State PEQ Contacts

Contents

Introduction

The following list includes contact information for State and Territory Plant Regulatory Officials (SPRO) and State PEQ Contacts. Plant Inspection Stations (PIS) should use this list when determining who to contact and to whom PEQ forms and correspondence should be sent, i.e., PPQ Form 236 for the State Contacts (copies number 3, 4, 5, and 6). A list of PPQ Liaison Officers for each State can be found in the Directory of PPQ Postentry Quarantine Liaison Officers.

National Plant Board

What is the National Plant Board?[1]

The National Plant Board is a nonprofit organization of the plant pest regulatory agencies of each of the states and Commonwealth of Puerto Rico. Member agencies **must** be members in good standing of the regional plant board in which their state or commonwealth is located.

Purpose[2]

Purposes of the National Plant Board as stated in its Articles of Incorporation include:

1. To provide national representation for the Eastern Plant Board, the Southern Plant Board, the Central Plant Board, and the Western Plant Board, and to receive, consider and implement to the extent possible, all regional plant board recommendations.
2. To foster effective and harmonized plant health programs; to act as an information clearinghouse on plant pest prevention and regulatory matters; to provide for a discussion of principles, policies and methods; and to make recommendations to the regional boards for the promotion of efficiency, harmony and uniformity in and among the states in the field of plant pest prevention and regulation.
3. To collaborate and communicate effectively with public and private agencies and organizations on plant health and plant pest regulatory issues which affect the states.
4. To protect agriculture, horticulture, forestry, and the environment on state, national and international levels.

1 This information was retrieved from the National Plant Board Web site.
2 *Id*.

The National Plant Board Members[3]

Membership of the National Plant Board is made up of the principal plant pest regulatory officials of each member commonwealth and state. This person is usually the administrator of the section of his or her state's Department of Agriculture which deals with pest prevention. Such units usually carry titles such as Plant Industry, Plant Health, Entomologist, State Plant Pathologist, etc. In some states the function is in an agency **other than** the department of agriculture.

Listings

Table C-1 Directory of State Plant Regulatory Officials and State PEQ Contacts (page 1 of 5)

State:	Contact:	Address:	Phone/FAX:
Alabama	Christel F. Harden, SPRO Plant Pest Administrator (christel.harden@agi.alabama.gov)	Alabama Department of Agriculture and Industries 1445 Federal Drive Montgomery, AL 36107	P: 334 240-7226 F: 334 240-7168
	Tim Johnson Plant Protection Inspector (ptimjohn@aol.com)	P.O. Box 764 Moulton, AL 35650	P:334 850-7736 F: None
Alaska	Mia Kirk (mia.kirk@alaska.gov)	Alaska Division of Agriculture 1800 Glenn Hwy, Suite 12 Palmer, AK 99645	P:907 761-3853 F:907 745-7112
Arizona	Rachel Paul (rpaul@azda.gov)	Arizona Department of Agriculture Plant Services Division 1688 West Adams St. Phoenix, AZ 85007	P:602 542-7184 F:602 542-1004
Arkansas	Paul Shell (paul.shell@aspb.ar.gov)	1 Natural Resources Dr. P.O. Box 1069 Little Rock, AR 72203	P:501 225-1598 F:501 225-3590
California	Nick Condos (nick.condos@cdfa.ca.gov)	CDFA Permits & Regulations 1220 N St., Room 210 Sacramento, CA 95814	P:916 654-1017 F:916 654-1018
Colorado	Mitch Yergert (mitchell.yergert@ag.state.co.us)	Division of Plant Industry Colorado Department of Agriculture 700 Kipling St., Suite 4000 Lakewood, CO 80215-5894	P:303 239-4140
CNMI	Michael (Troy) Brown (michael.t.brown@aphis.usda.gov)	USDA, APHIS, PPQ 17-3306 Neptune Avenue Barrigada, GU 96913	P:671 475-0854 F:671 475-0853
Connecticut	Victoria Smith (victoria.smith@ct.gov)	The Connecticut Agricultural Experiment Station 123 Huntington St. New Haven, CT 06511	P: 203-974-8474

3 *Id.*

Table C-1 Directory of State Plant Regulatory Officials and State PEQ Contacts (page 2 of 5)

State:	Contact:	Address:	Phone/FAX:
Delaware	Faith Kuehn, SPRO (faith.kuehn@state.de.us) Jeff Brothers, Supervisor Nursery Inspection (jeffrey.brothers@state.de.us)	Delaware Dept. of Agriculture Plant Industries Section 2320 South DuPont Hwy. Dover, DE 19901	P:302 698-4500 F: 302 697-6287
District of Columbia	Matthew A. Travis, SPHD (matthew.a.travis@aphis.usda.gov)	USDA, APHIS, PPQ 2200 Broening Highway, Suite 140 Baltimore, MD 21224	P:410 631-0073 F:410 631-0069 C:410 977-7214
Florida	Stephen A. Hildebrandt, Certification Specialist (Stephen.hildebrandt@freshfromflorida.com)	Division of Plant Industry P.O. Box 147100 1911 Southwest 34th St. Gainesville, FL 32614-7100	P:352 395-4714 F: 352 395-4618
Georgia	James “Trey” Clarke (James.Clark@agr.georgia.gov)	Georgia Dept. of Agriculture Plant Protection Division 19 Martin Luther King, Jr. Dr.,SW Room 243 Atlanta, GA 30334	P:770 550 5978
Guam	Dr. Russell Campbell (guament@teleguam.net)	Guam Department of Agriculture 17-3306 Neptune Avenue Barrigada, GU 96913	P:671 475-1427 F:671 477-9487
Hawaii	Jonathan Ho (jonathan.k.ho@hawaii.gov)	Hawaii Department of Agriculture 1849 Auiki St. Honolulu, HI 96819	P:808 832-0574 F:808 832-0584
Idaho	Michael Cooper (mike.cooper@agri.idaho.gov)	Division of Plant Industries Idaho State Dept. of Agriculture P.O. Box 790 Boise, ID 83701-0790	P:208 332-8620
Illinois	Mark Cinnamon, Supervisor	Illinois Dept. of Agriculture Bureau of Environmental Programs CMS North Suburban, Room A 169 9511 Harrison St. Des Plaines, IL 60016	P:847 294-4343
Indiana	Philip T. Marshall (pmarshall@dnr.IN.gov)	Indiana Dept. of Natural Resources Division of Entomology and Plant Pathology 402 West Washington St., Room 290W Indianapolis, IN 46204	P:317 232-4189 F:317-232-2649 C:812 595-2740
Iowa	Robin Pruisner (robin.pruisner@IowaAgriculture.gov)	Iowa Dept. of Agriculture and Land Stewardship State Entomologist 2230 South Ankeny Blvd. Ankeny, IA 50023	P:515-725-1470
Kansas	Jeff Vogel	Kansas Dept. of Agriculture Plant Protection and Weed Control Forbes Field, Bldg. 282 P.O. Box 19282 Topeka, KS 66619	P:785 862-2180 F:785 862-2182

Table C-1 Directory of State Plant Regulatory Officials and State PEQ Contacts (page 3 of 5)

State:	Contact:	Address:	Phone/FAX:
Kentucky	Joe Collins (joe.collins@uky.edu)	University of Kentucky Department of Entomology Agricultural Science Bldg. N, Rm. S225 Lexington, KY 40546	P:859 257-5838 F:859 257-3807
Louisiana	Ansel Rankins (arankins@ldaf.state.la.us)	Louisiana Dept. of Agriculture and Forestry 5825 Florida Blvd., Suite 3002 Baton Rouge, LA 70821-3596	P:225 952-8100 F:225 923-4904
Maine	Sarah Scally (sarah.h.scally@maine.gov)	Maine Dept. of Agriculture 28 State House Station Augusta, ME 04333	P:207 287-3891 F:207 287-7548
Maryland	Robert B. Trumbule (robert.trumbule@maryland.gov)	Maryland Dept. of Agriculturer Plant Protection and Weed Mgmt. 10300 Baltimore Ave. Bldg. 308, Room 305, BARC-E Beltsville, MD 20705	P:301 982-3224
Massachusetts	Taryn LaScola (Taryn.LaScola@state.ma.us)	Massachusetts Dept. of Agricultural Resources 251 Causeway St., Suite 500 Boston, MA 02114	
Michigan	Richard C. Kaitany, Ph.D. (kaitanyr@michigan.gov)	MDA and Rural Development Geagley Laboratory Building 615 South Harrison Rd. East Lansing, MI 48823	P:517 337-5091 F:517 337-5094
Minnesota	Geir Friisoe (geir.friiscoe@state.mn.us)	Minnesota Dept. of Agriculture Plant Protection Division Orville Freeman Office Building 625 Robert St. North St. Paul, MN 55155-2538	P:651 201-6174
Mississippi	Mississippi Dept. of Agriculture and Commerce (Kenneth@mdac.state.ms.us)	Bureau of Plant Industry P.O. Box 5207 Mississippi State, MS 39762	P:662 325-7765 F:662 325-0397
Missouri	Collin Wamsley, State Entomologis (collin.wamsley@mda.mo.gov)	Missouri Dept. of Agriculture P.O. Box 630 Jefferson City, MO 65102	P:573 751-5505 F:573 751-0007
Montana	Elizabeth (Beth) Eiring (eeiring@mt.gov)	Montana Department of Agriculture P.O. Box 200201 Helena, MT 59620-0201	P:406-444-9066 F:406 444-5409
Nebraska	Julie Van Meter	P.O. Box 94756 Lincoln, NE 68509	P:402 471-2394 F:402 471-6892
Nevada	Dawn Rafferty (rafferty@agri.nv.gov)	Nevada Dept. of Agriculture Plant Industry 350 Capital Hill Ave. Reno, NV 89502-2992	P:775 688-1182 F:775 688-1178
New Hamp-shire	Chris Rallis (crallis@agr.state.nh.us)	New Hampshire Dept. of Agriculture, Markets, and Food State Laboratory Building D 6 Hazen Dr. Concord, NH 03301	P:603 271-3691 F:603 271-3692

Table C-1 Directory of State Plant Regulatory Officials and State PEQ Contacts (page 4 of 5)

State:	Contact:	Address:	Phone/FAX:
New Jersey	Joseph Zoltowski (joseph.zoltowski@ag.state.nj.us)	Division of Plant Industry New Jersey Dept. of Agriculture P.O. Box 330 Trenton, NJ 08625	P:609 292-5440
New Mexico	Brad Lewis, Bureau Chief (blewis@nmda.nmsu.edu)	Bureau of Entomology and Nursery Industries New Mexico Dept. of Agriculture P.O. Box 30005 MSC 3BA Las Cruces, NM 88003-0005	P:505 646-3207
New York	Margaret Kelly, Assistant Director (margaret.kelly@agriculture.ny.gov)	Division of Plant Industry New York Dept. of Agriculture and Markets 10 B Airline Dr. Albany, NY 12235	P:518 457-5985 F:518 457-1204
North Carolina	Eastern NC: R. Ann Gallagher (Ann.Gallagher@ncagr.gov)	North Carolina Dept. of Agriculture and Consumer Services 725 Appaloosa Way Wake Forest, NC 27587	P:919-218-1765
	Western NC: Jim Corbin (jim.corbin@ncagr.gov)	North Carolina Dept. of Agriculture and Consumer Services 89 Oakwood Lane Sylva, NC 28779	C: 828-421-5445
North Dakota	Judy Carlson, SPRO (jcarlson@nd.gov)	North Dakota Dept. of Agriculture 600 East Boulevard Ave., Dept. 602 Bismark, ND 58505-0020	P:701 328-4997
Ohio	Dan Kenny (dkenny@agri.ohio.gov)	Ohio Dept. of Agriculture Plant Pest Control Section 8995 East Main St. Reynoldsburg, OH 43068	P:614 728-6400 F:614 728-6453
Oklahoma	Jeanetta Cooper (cooper@oda.state.ok.us)	2800 North Lincoln Blvd. Oklahoma City, OK 73105	P:405 522-5971 F:405 522-4584
Oregon		Plant Division Oregon Dept. of Agriculture 635 Capital St., NE Salem, OR 97310-0110	P:503 986-4644
Pennsylvania	Dana Rhodes (danrhodes@.pa.gov)	Bureau of Plant Industry Pennsylvania Dept. of Agriculture 2301 North Cameron St. Harrisburg, PA 17110	P:717 772-5205 F:717 783-3275
Puerto Rico	Nilda Perez (sanidadvegetal@prtc.net)	Puerto Rico Dept. of Agriculture P.O. Box 10163 San Juan, PR 00908-1163	P:787 724-4627 F:787 724-6955
Rhode Island	Ken Ayars (ken.ayars@dem.ri.gov)	RI DEM Division of Agriculture 235 Promenade St., Rm. 370 Providence, RI 02908	P: 401-222-2781 ext. 4500
South Carolina	Thad Raymond (theodoj@clemson.edu)	Dept. of Plant Industry 904 F R Huff Drive, Suite 101 P.O. Box 161 St. Matthews, SC 29135	P:803 874-2354 F:803 874-2461

Table C-1 Directory of State Plant Regulatory Officials and State PEQ Contacts (page 5 of 5)

State:	Contact:	Address:	Phone/FAX:
South Dakota	Kevin Fridley, Director (kevin.fridley@state.sd.us)	Plant Industry Program Division of Regulatory Services South Dakota Dept. of Agriculture 523 E. Capitol Pierre, SD 57501-3185	P:605 773-3796
Tennessee	Anni Self (anni.self@state.tn.us)	Ellington Agricultural Center P.O. Box 40627, Melrose Station 440 Hogan Rd., Porter Bldg. Nashville, TN 37204	P:615 837-5313 F:615 837-5246
Texas	Awinash Bhatkar (awinash.bhatkar@texasagricul-ture.gov)	Texas Dept. of Agriculture P.O. Box 12847 Austin, Texas 78711	P:512 463-5025 F:888 215-5385
Utah	Clint Burfitt (c.burfitt@utah.gov)	Utah Dept. of Agriculture and Food Plant Industry 350 North Redwood Rd. P.O. Box 146500 Salt Lake City, UT 84116-6500	P:801 538-7184 F:801 538-7126
Vermont	Tim Schmalz, VT Plant Pathologist (tim.schmalz@state.vt.us)	Lab Division 103 South Main St. Waterbury, VT 05676	P:802 241-3544 F:802 241-3008
Virginia	Larry Nichols (larry.nichols@vdacs.virginia.gov)	Virginia Dept. of Agriculture and Consumer Services P.O. Box 1163 Richmond, VA 23218	P:804 786-3515
Washington	John Wraspir, Plant Services Program Supervisor (jwraspir@agr.wa.gov)	Washington State Dept. of Agriculture Plant Protection Division 117 N. First Street, Suite 38 Mount Vernon, WA 98273	P:360 416-7551 F:360 416-7552
West Virginia	Eric Ewing (eewing@wvda.us)	WVDA—Plant Industries Division 1900 Kanawha Blvd. East Charleston, WV 25305-0191	P:304 558-2212 F:304 558-2435
Wisconsin	Ellen Natzke (ellen.natzke@wisconsin.gov)	Wisconsin Dept. of Agriculture, Trade, & Consumer Protection P.O. Box 8911 Madison, WI 53708-8911	P:608 224-4576 F:608 224-4656
Wyoming	Hank Uhden, Technical Service Manager (hank.uhden@wyo.gov)	Wyoming Dept. of Agriculture 2219 Carey Ave. Cheyenne, WY 82002-0100	P:307 777-6574 F: 307-777-6593

Appendix

D

Violations of the Postentry Growing Agreement

Contents

Roles in Handling and Documenting Violations

This appendix details what the State Cooperator, Postentry Quarantine Liaison Officer, Representative of the Postentry Quarantine Program (PEQP), local Investigative and Enforcement Services (IES) Investigator, and State Plant Health Director (SPHD) do when a State Cooperator detects a violation of the Postentry Growing Agreement (PPQ Form 546).

CAUTION

The SPHD and/or the PEQP decides whether to request that the permit unit revoke a company's or individual's postentry permit. Moreover, the SPHD decides, with input from the Liaison Officer, IES Enforcement Operations, and State Cooperator, whether it is more appropriate to issue a warning letter or pursue prosecution.

1. The State Cooperator detects the violation. The following are violations of the Postentry Growing Agreement (PPQ Form 546):
   A. The cooperator finds plants growing on premises **not** controlled by the person or company who signed the Agreement. If there was approval from the State and the National Coordinator for Postentry Quarantine in Beltsville, MD, or, for Hawaii, Guam, and CNMI, the Postentry Coordinator in Honolulu, HI to move the plants, no violation occurred.
   B. The person who signed the Postentry Growing Agreement, or a representative of the company signing the Agreement, refuses to allow a cooperator on the premises during the cooperator's normal business hours.
   C. The cooperator finds quarantined plant(s) or any material propagated from these plants unlabeled or with inappropriate labeling. The label

must show the plant name, the port accession number, and the importation date.

D. The cooperator finds other postentry genera or domestic plants of the same genus planted within 3 meters (approximately 10 feet) of the postentry plants.

E. The cooperator learns that postentry plants have been propagated by seed or other propagules (e.g., air layers, cuttings, flowers, plants, or suckers) taken from the quarantined plants when there was no prior written approval by the State and the National Coordinator for Postentry Quarantine or, for Hawaii, Guam, and CNMI, the Postentry Coordinator.

F. The person who signed the Postentry Growing Agreement, or a representative of the company signing the Agreement, refuses to apply a treatment prescribed by the cooperator to eliminate pests on the quarantined plant material. Treatment may include destruction of the quarantined plant material when prescribed by the cooperator as the **only** way to eliminate pests.

G. The cooperator, using his or her best professional judgment, believes the person who signed the Postentry Growing Agreement, or a representative of the company signing the Agreement, failed to notify the State or Liaison Officer when that person had an opportunity to report a conspicuous abnormality in the plant material. The importer **must** also report the death of a plant or plants to the cooperator.

H. The cooperator learns that the person who signed the Postentry Growing Agreement, or a representative of the company signing the Agreement, failed to report an address change to the PEQP.

I. The cooperator finds plants of Rubus spp. from Europe growing outside or growing in an indoor facility with mesh larger than 16 mesh per inch, or finds *Chrysanthemum* or *Dianthus* growing outside an enclosed building.

J. The cooperator finds some or all of the plants are unaccounted for before release at 6 months for *Chrysanthemum*, 1 year for *Dianthus*, or 2 years for the remaining postentry genera.

K. The cooperator detects any violations of restrictions listed in the permit.

2. If the State Cooperator detects an apparent pest risk, he or she eliminates the risk immediately. Such actions may include prescribing a treatment or supervising the destruction of the infested or infected plants.
3. The State Cooperator reports the violation and any action taken to eliminate pest risk to the Liaison Officer within 1 work day or the discovery of the violation.

4. The Liaison Officer informs the SPHD and either one will then issue an EAN (PPQ Form 523).

> **CAUTION**
>
> For **first-time** offenders a Letter of Information (LOI) can be used **before** issuing a PPQ 518 Report of Violation on page F-9. The LOI may be issued instead of referring the matter to Investigative and Enforcement Services (IES) for investigation and possible issuance of civil or criminal penalties. The intent of the letter is to educate alleged noncompliant entities about APHIS regulations and their obligation to comply with them. The LOI may be used as the first step toward achieving compliance. In the event the violation continues and IES conducts a subsequent investigation, the LOI may be used as evidence to show the alleged violator had notice of regulatory requirements and may be considered aggravating factors to increase civil penalties. Details on preparing, issuing, communicating, and documenting a LOI can be found at http://sp.we.aphis.gov/PPQ.fieldops/pgmops/excop/CandE/default.aspx.

5. The Liaison Officer and the IES Investigator meet with the State Cooperator to review the details of the violation. It would be favorable for the Liaison Officer, the State Cooperator, and the IES Investigator to visit the premises where the violation occurred.
6. Having the details of the violation, the Liaison Officer contacts the PEQP to give details of the incident.
7. The IES Investigator assembles a case file that includes affidavits from the State Cooperator, witnesses, and violator.
8. Once the case file is completed, the IES investigator writes a cover letter to transmit a copy of that file to the SPHD. The original investigative case file will be sent to the IES headquarters office in Riverdale, Maryland for review.
9. Following the guidelines of the Civil Penalty Action Team, the reviewer at the IES headquarters staff will submit an e-mail to the Coordinator, Postentry Quarantine Program and SPHD with a projected recommendation. The following are actions that may be appropriate forms of action:
   A. Official Warning Letter (APHIS Form 7060)
   B. Civil penalty
   C. Revocation of the Controlled Import Permit for Postentry Quarantine (CIP)
   D. Innovative terms (suspend a portion of the civil penalty provided training is provided by the violator)

Instructions for Completing a Report of Violation (PPQ Form 518)

While completing the form, the Liaison Officer will interview the State Cooperator to obtain a statement of the facts surrounding the alleged violation. The IES Investigator will interview all other parties including the violator and witnesses.

Table D-1 Instructions for completing a Report of Violation (PPQ Form 518) (page 1 of 2)

Block :	Instructions:
1. Date Violation Discovered	Enter the date the State Cooperator discovered the violation
2. Reg/Compl. Agreement Violated	Enter the regulation violated. If it is a violation of the Postentry Growing Agreement, enter 7 CFR 319.37-7
3. Where Intercepted	Enter the city and State where the violation was detected
4. Origin of Article	Fill in the name of the country where the postentry material was originally grown
5. Article Moved in Violation of Regulations	Enter “Material grown under postentry quarantine”
6. Identity of Article	Enter the number and identity of the plants associated with the violation. If available, fill in both common and scientific name. Always enter the scientific name
7. Name and Business Address of Violator	Fill in the violator’s name—sually this will be the name of the person who signed the Postentry Growing Agreement (in parentheses after the name, give the person’s position (e.g., owner, nurseryman, grower, salesperson)) and if appropriate, enter the violator’s business address
8. Violator Had/If No, Violator was Aware of Regulation	Check and fill in as appropriate
9. Violator Had/If No, Violator was Aware of Regulation	If the name of the violator and the name of the person signing the Postentry Growing Agreement are the same, check “Yes”
10. Violator Had/If No, Violator was Aware of Regulation	Write, “(name of violator) signed a Postentry Growing Agreement on (date signed) a copy of which is on file”
11. Carrier Information	Draw a diagonal line through
12. Carrier Information	Draw a diagonal line through
13. Name and Business Address of Consignee	Cross out “NAME AND BUSINESS ADDRESS OF CONSIGNEE” and write, “ADDRESS OR LOCATION WHERE MATERIAL IS BEING GROWN”—ill in the complete address or, as accurate, a description of the property as practicable
14. Disposition of Pest Risk	Fill in the action(s) taken to eliminate the pest risk, e.g., “the plants were rouged and incinerated,” or, “the plants were sprayed with (description of pesticide and how applied)”—if applicable, include the Emergency Action Notice as an attachment and reference in the Officer’s Statement
15. Remarks	Fill in any pertinent remarks or the information from the continuation of another Block
16. Violator or Carrier’s Statement of Violation	The IES Investigator will obtain an affidavit or statement from the violator and all other subjects once the investigation is underway

Table D-1 Instructions for completing a Report of Violation (PPQ Form 518) (page 2 of 2)

Block :	Instructions:
17. Liaison Officer's Statement	Together with your State Cooperator, describe the violation on a separate sheet of paper; give this statement an exhibit number. A State Cooperator and/or a Liaison Officer's Statement **must** be written and accompany each PPQ Form 518 submitted. Describe all the facts associated with the violation of the Postentry Growing Agreement. Write down all the facts including who, what, when, where, and how. Include the information in Figure D-1 on page D-6 when appropriate—Sign and date the Liaison Officer's Statement (**only** this person signs). If more than one officer was involved in the violation, each officer **must** write a separate statement.
18. Signatures and Dates	Fill in as appropriate
19. Signatures and Dates	Fill in as appropriate
20. Signatures and Dates	Fill in as appropriate
21. Officer in Charge Comments	SPHD should fill in any additional information that may help to substantiate the case: e.g., specify any previous warning letters and the dates sent; list any known previous civil penalties, case numbers, dates, and amounts of penalties assessed—word this information as follows: "Case #RSS-CP-45-95 fined $1,000 on 03/07/06." Recommend the appropriate action. Limit your recommendations to the following actions: ◆ No action ◆ Letter of warning ◆ Civil penalty ◆ Innovative terms ◆ Revocation of the Controlled Import Permit for Postentry Quarantine (CIP)

LIAISON OFFICER'S STATEMENT PREPARATION

Officer's Statement Should Contain the following:

Your identity	**The violator's identity**
Full name	Full name(s)
Work address	Address
Phone number	Phone Number
Badge number	

Capture information on everyone involved i.e. State inspector.

WHAT HAPPENED?
Provide a full explanation of what happened. It is easiest to prepare the statement in chronological order, providing a step-by-step account of events. Consider the following questions:

- What commodity or organisms was involved
- What was the nature of the alleged violation?
- Are there records that show what happened?
- Are there any photographs to support you statement?

WHEN DID THIS OCCUR?
It is important to record the time/date of each event.

WHERE DID THIS OCCUR?
Give location details

- Physical addresses
- Mailing addresses

WHY DID THIS HAPPEN?
If able to determine, describe why. Examples:

- Not knowing the regulations
- Oversight
- Record what you know and what was said, not what you suspect

HOW?

- How did you discover the alleged violation(s)?
- How did the alleged violation(s) occur based upon observation or evidence?
- Be specific
- Avoid assumptions unless circumstantial evidence supports them.

IT'S CRUCIAL TO BE SPECIFIC ON ALL DETAILS:

Can someone else reading your narrative fully understand and explain what happened?

Figure D-1 Liaison Officer's Statement Preparation

Instructions for Conducting an Investigation and Assembling a Case File

The purpose of conducting an investigation is to substantiate that a violation took place. The Office of the General Counsel (OGC) will decide whether to prosecute a violation based on the results of the investigation and how well the case file was prepared. Only a sound investigation and well-prepared case file will result in a successful prosecution!

During the investigation, **do not** discuss any phase of the investigation with unauthorized persons (non-APHIS personnel) **except** for the State Cooperator(s) who initially detected the violation.

Once the PPQ Form 518 has been prepared, the officer’s statement and any associate evidence (invoices, sales receipts/records, packing lists, photographs, Emergency Action Notification, Compliance Agreement, and any other pertinent records) should be submitted to the local IES investigator. Also, provide Postentry Permit copies, Postentry growing agreements (PPQ Form 546) and Notices of Arrival (PPQ Form 236).

Once a violation has been noted, always document what transpired. Collect evidence to corroborate the violation. If germane to your case, take photographs. Photographs make forceful evidence. When submitting photographs, write the date, description, and photographer's name on the back of the photograph or on a piece of paper onto which the photograph is mounted. Physical evidence such as counterfeit or forged labels on postentry plants, samples of propagules collected from postentry plants without permission, etc. should be assembled. If the physical evidence presents a risk, submit it so as to prevent disease dissemination—put it in a tightly closed plastic bag.

The IES investigator can obtain a statement or prepare an affidavit to enter as evidence for the investigative case report. The investigator will also obtain written statements from all persons who have knowledge of the violation.

IES Distribution of the Case File

When the IES investigator sends the case file to the IES staff in Riverdale, MD, he or she will make a copy for the SPHD.

Table D-2 Case File Responsibilities

If you are a:	Then:
Liaison Officer	REPORT serious violations to the PEQU in Beltsville, MD within 1 work day of notification by the State Cooperator
	GIVE or SEND the originals of the evidence directly to the IES investigator or through your local SPHD
State Plant Health Director (SPHD)	If you have additional information on earlier violations or anything else germane to this case, give a statement to the IES investigator
	SEND a copy of the case file to the National Coordinator at the PEQU in Beltsville, MD
The National Coordinator of the PEQP	REVIEW the case file
	NOTIFY the Permit Unit in Riverdale, MD
	SERVE as advisor on the case to the IES staff in Riverdale, MD

Appendix

E

Plant Genera Subject to Postentry Quarantine

Introduction

Please refer to the *Plants for Planting Manual* Chapter 4: Lists of Regulated Propagative Material at the following address to determine plant genera that **must** be grown in postentry, *see* http://www.aphis.usda.gov/import_export/plants/manuals/ports/downloads/plants_for_planting.pdf.

Appendix

F

Forms and Permits

Contents

APHIS 7060, Official Warning, Violation of Federal Regulations

UNITED STATES DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE

CASE NO.

VIOLATOR

OFFICIAL WARNING
VIOLATION OF FEDERAL REGULATIONS

ADDRESS *(Street, City, State, Zip Code)*

The Department of Agriculture has evidence that on or about ________________, 19____ you or your organization committed the following violation of Federal Regulations:

EXAMPLE

Titles 7 & 9 Code of Federal Regulations were promulgated to help prevent the spread of animal and plant pests and diseases and assure the humane treatment of animals. Since violations of the regulations can have serious and costly impact detrimental to the public interest, you are warned of this violation. Any further violation of these regulations may result in the assessment of a civil penalty or criminal prosecution. If you have any questions concerning this warning or violation, please contact the listed APHIS Official.

APHIS OFFICIAL *(Name, Title)*		OFFICE ADDRESS:
SIGNATURE	DATE ISSUED	TELEPHONE NO. AC ( )
FOR PERSONAL SERVICE - RECEIVED BY: *(Name and signature)*		DATE RECEIVED:
FOR CERTIFIED MAIL - RECEIPT NO:		

APHIS FORM 7060 (JUN 91) — Previous editions may be used.

Figure F-1 APHIS 7060, Official Warning, Violation of Federal Regulations

PPQ 236 Notice of Shipment and Report of Imported Plants to be Grown Under Postentry Quarantine

U.S. DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE
PLANT PROTECTION AND QUARANTINE

NOTICE OF SHIPMENT AND REPORT OF INSPECTION OF IMPORTED PLANTS TO BE GROWN UNDER POSTENTRY QUARANTINE

1. INSPECTION STATION

2. POSTENTRY PERMIT NO.

3. INSPECTION STATION REFERENCE NO.

4. NAME AND MAILING ADDRESS OF PERMITTEE *(Include Zip code)*

ACTION	DATE	TIME
5. RECEIVED		
6. INSPECTED		
7. RELEASED		
8. FORWARDED		

Permittee should notify Plant Protection and Quarantine of change of mailing address, or if shipment is to be grown at an approved growing site other than location show in Item 4 or 9.

9. APPROVED GROWING SITE IF DIFFERENT FROM ITEM 4 *(Specify if "Same")*

10. PLANTS IMPORTED *(Number and kind)*

A.

B.

C.

D.

E.

F.

G.

H.

I.

J.

11. ORIGIN

12. CONDITION OF PLANTS ON ARRIVAL

13. INSECTS INTERCEPTED

14. DISEASES INTERCEPTED

15. TREATMENT

16. REMARKS *(No. of postentry tags forwarded, method of transportation, certification, packing material, etc.)*

17. SIGNATURE OF PLANT PROTECTION AND QUARANTINE OFFICER

PPQ FORM 236 *(Previous edition is obsolete)*
AUG 2000

EXAMPLE

Figure F-2 Example of PPQ Form 236, Notice of Shipment and Report of Imported Plants to be Grown Under Postentry Quarantine (page 1 of 3)

PLANT HEALTH DATA

PLANTS IMPORTED	NO.	DATE AND FINDINGS	DATE AND FINDINGS	DATE AND FINDINGS	DATE AND FINDINGS
A.					
B.					
C.					
D.					
E.					
F.					
G.					
H.					
I.					

RECOMMENDED FOR RELEASE		RECOMMENDED FOR RELEASE	
SIGNATURE OF FIELD INSPECTOR	DATE	SIGNATURE OF FIELD INSPECTOR'S SUPERVISOR	DATE
TITLE		TITLE	

RECOMMENDED FOR RELEASE		RELEASED FROM DETENTION	
SIGNATURE	DATE	SIGNATURE	DATE
TITLE		TITLE	
POSTENTRY QUARANTINE LIAISON OFFICER		COORDINATOR, POSTENTRY QUARANTINE PROGRAM	

PPQ FORM 236 (Reverse Parts 4, 5, 6)

Figure F-2 Example of PPQ Form 236, Notice of Shipment and Report of Imported Plants to be Grown Under Postentry Quarantine (page 2 of 3)

PPQ236CopyDesignation

Pt.1	PERMITTEE'SCOPY
Pt.2	POSTENTRYQUARANTINEUNITCOPY
Pt.3	STATEOFFICE(FileCopy)
Pt.4	INSPECTIONRECORD(TobereturnedtoPostentry QuarantineUnitafterformonreversesideiscompleted.)
Pt.5	INSPECTIONRECORD(TobereturnedtoPostentry QuarantineUnitafterformonreversesideiscompleted.)
Pt.6	PPQFIELDOFFICECOPY(tobereturnedwithPt.4and/or Pt.5tothePostentryQuarantineUnit.)
Pt.7	INSPECTIONSTATIONCOPY

Table F-2 Example of PPQ Form 236, Notice of Shipment and Report of Imported Plants to be Grown Under Postentry Quarantine (page 3 of 3)

Routing and Distribution of PPQ Form 236

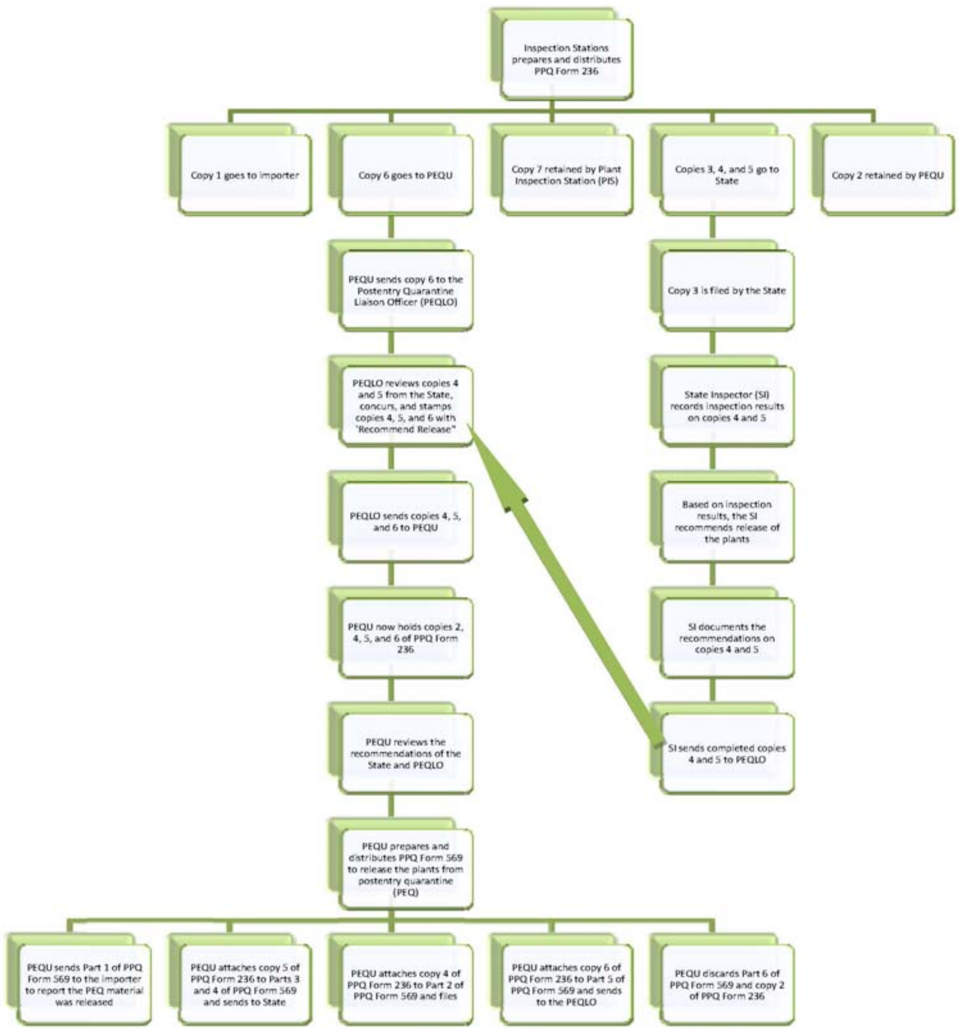


Figure F-3 Routing and Distribution of PPQ Form 236

PPQ Form 391 Specimens for Determination

This report is authorized by law (7 U.S.C. 147a). While you ar not required to respond your cooperation is needed to make an accurate record of plant pest conditions.

See reverse for additional OMB information.

FORM APPROVED
OMB NO. 0579-0010

U.S. DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE

SPECIMENS FOR DETERMINATION

Instructions: Type or print information requested. Press hard and print legibly when handwritten. Item 1 - assign number for each collection beginning with year, followed by collector's initials and collector's number. Example (collector, John J. Dingle): 83-JJD-001.
Pest Data Section – Complete Items 14, 15 and 16 or 19 or 20 and 21 as applicable. Complete Items 17 and 18 if a trap was used.

FOR IIBIII USE
LOT NO.
PRIORITY

1. COLLECTION NUMBER
2. DATE — MO / DA / YR
3. SUBMITTING AGENCY — ☐ State Cooperator ☐ PPQ ☐ Other ____

SENDER AND ORIGIN

4. NAME OF SENDER
5. TYPE OF PROPERTY *(Farm, Feedmill, Nursery, etc.)*
6. ADDRESS OF SENDER
ZIP
INTERCEPTION SITE
7. NAME AND ADDRESS OF PROPERTY OR OWNER
COUNTRY/ COUNTY

PURPOSE

8. REASON FOR IDENTIFICATION *("X" ALL Applicable Items)*

A. ☐ Biological Control (Target Pest Name)
B. ☐ Damaging Crops/Plants
C. ☐ Suspected Pest of Regulatory Concern *(Explain in* REMARKS)
D. ☐ Stored Product Pest
E. ☐ Livestock, Domestic Animal Pest
F. ☐ Possible Immigrant *(Explain in* REMARKS)
G. ☐ Survey *(Explain in* REMARKS)
H. ☐ Other *(Explain in* REMARKS)

9. IF PROMPT OR URGENT IDENTIFICATION IS REQUESTED, PLEASE PROVIDE A BRIEF EXPLANATION UNDER "REMARKS".

HOST DATA

10. HOST INFORMATION
NAME OF HOST *(Scientific name when possible)*
NUMBER OF ACRES/PLANTS
11. QUANTITY OF HOST
PLANTS AFFECTED *(Insert figure and indicate* ☐ Number ☐ Percent*)*:

12. PLANT DISTRIBUTION
☐ LIMITED
☐ SCATTERED
☐ WIDESPREAD

13. PLANT PARTS AFFECTED
☐ Leaves, Upper Surface ☐ Leaves, Lower Surface ☐ Petiole ☐ Stem
☐ Trunk/Bark ☐ Branches ☐ Growing Tips ☐ Roots
☐ Bulbs, Tubers, Corms ☐ Buds ☐ Flowers ☐ Fruits or Nuts
☐ Seeds

PEST DATA

14. PEST DISTRIBUTION
☐ FEW
☐ COMMON
☐ ABUNDANT
☐ EXTREME

15. ☐ INSECTS ☐ NEMATODES ☐ MOLLUSKS

NUMBER SUBMITTED	LARVAE	PUPAE	ADULTS	CAST SKINS	EGGS	NYMPHS	JUVS.	CYSTS
ALIVE								
DEAD								

16. SAMPLING METHOD
17. TYPE OF TRAP AND LURE
18. TRAP NUMBER

19. PLANT PATHOLOGY – PLANT SYMPTOMS *("X" one and describe symptoms)*
☐ ISOLATED ☐ GENERAL

20. WEED DENSITY
☐ FEW ☐ SPOTTY ☐ GENERAL

21. WEED GROWTH STAGE
☐ SEEDLING ☐ VEGETATIVE ☐ FLOWERING/FRUITING ☐ MATURE

22. REMARKS

23. TENTATIVE DETERMINATION

24. DETERMINATION AND NOTES *(Not for Field Use)*

FOR IIBIII USE
DATE RECEIVED
NO.
LABEL
SORTED
PREPARED
DATE ACCEPTED
RR

SIGNATURE
DATE

PPQ FORM 391
(AUG 02)
Previous editions are obsolete.

Click to Submit Form

This is a 6-Part form. Copies must be disseminated as follows:
☐ PART 1 – PPQ ☐ PART 2 – RETURN TO SUBMITTER AFTER IDENTIFICATION ☐ PART 3 – IIBIII OR FINAL IDENTIFIER
☐ PART 4 – INTERMEDIATE IDENTIFIER ☐ PART 5 – INTERMEDIATE IDENTIFIER ☐ PART 6 – RETAINED BY SUBMITTER

EXAMPLE

Figure F-4 Example of PPQ Form 391 Specimens for Determination (page 1 of 2)

OMB Information

According to the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0579-0010. The time required to complete this information collection is estimated to average .25 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

Instructions

Use PPQ Form 391, Specimens for Determination, for domestic collections (warehouse inspections, local and individual collecting, special survey programs, export certification).

BLOCK	INSTRUCTIONS
1	1. Assign a number for each collection beginning the year, followed by the collector's initials and collector's number **EXAMPLE** In 2001, Brian K. Long collected his first specimen for determination of the year. His first collection number is 01-BLK-001 2. Enter the collection number
2	Enter date
3	Check block to indicate Agency submitting specimens for identification
4	Enter name of sender
5	Enter type of property specimen obtained from (farm, nursery, feedmill, etc.)
6	Enter address
7	Enter name and address of property owner
8A-8L	Check all appropriate blocks
9	Leave Blank
10	Enter scientific name of host, if possible
11	Enter quantity of host and plants affected
12	Check block to indicate distribution of plant
13	Check appropriate blocks to indicate plant parts affected
14	Check block to indicate pest distribution
15	• Check appropriate block to indicate type of specimen • Enter number specimens submitted under appropriate column
16	Enter sampling method
17	Enter type of trap and lure
18	Enter trap number
19	Enter X in block to indicate isolated or general plant symptoms
20	Enter X in appropriate block for weed density
21	Enter X in appropriate block for weed growth stage
22	Provide a brief explanation if Prompt or URGENT identification is requested
23	Enter a tentative determination if you made one
24	Leave blank

Distribution of PPQ Form 391

Distribute PPQ Form 391 as follows:

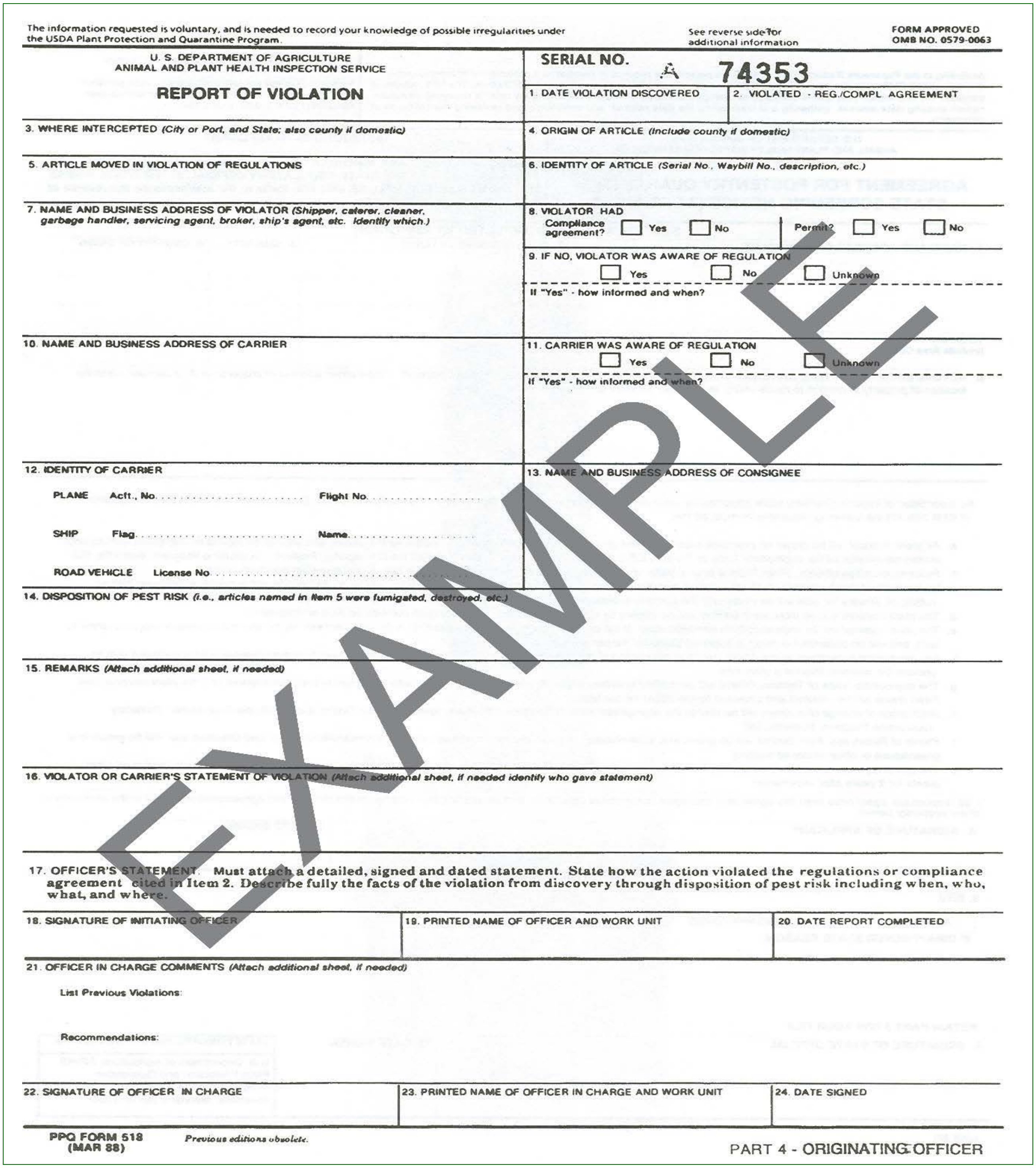
1. Send Original along with the sample to your Area Identifier.
2. Retain and file a copy for your records.

Figure F-4 Example of PPQ Form 391 Specimens for Determination (page 2 of 2)

NOTICE

The above form **must** accompany any disease specimen for identification sent to the Postentry Quarantine Unit by State Cooperators or local PPQ identifiers.

PPQ 518 Report of Violation



The information requested is voluntary, and is needed to record your knowledge of possible irregularities under the USDA Plant Protection and Quarantine Program.

See reverse side for additional information

FORM APPROVED
OMB NO. 0579-0063

U. S. DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE

REPORT OF VIOLATION

SERIAL NO. A 74353

1. DATE VIOLATION DISCOVERED
2. VIOLATED - REG./COMPL. AGREEMENT
3. WHERE INTERCEPTED *(City or Port, and State; also county if domestic)*
4. ORIGIN OF ARTICLE *(Include county if domestic)*
5. ARTICLE MOVED IN VIOLATION OF REGULATIONS
6. IDENTITY OF ARTICLE *(Serial No., Waybill No., description, etc.)*
7. NAME AND BUSINESS ADDRESS OF VIOLATOR *(Shipper, caterer, cleaner, garbage handler, servicing agent, broker, ship's agent, etc. Identify which.)*
8. VIOLATOR HAD
   Compliance agreement? ☐ Yes ☐ No   Permit? ☐ Yes ☐ No
9. IF NO, VIOLATOR WAS AWARE OF REGULATION
   ☐ Yes ☐ No ☐ Unknown
   If "Yes" - how informed and when?
10. NAME AND BUSINESS ADDRESS OF CARRIER
11. CARRIER WAS AWARE OF REGULATION
   ☐ Yes ☐ No ☐ Unknown
   If "Yes" - how informed and when?
12. IDENTITY OF CARRIER
   PLANE Acft., No. .... Flight No. ....
   SHIP Flag .... Name ....
   ROAD VEHICLE License No. ....
13. NAME AND BUSINESS ADDRESS OF CONSIGNEE
14. DISPOSITION OF PEST RISK *(i.e., articles named in item 5 were fumigated, destroyed, etc.)*
15. REMARKS *(Attach additional sheet, if needed)*
16. VIOLATOR OR CARRIER'S STATEMENT OF VIOLATION *(Attach additional sheet, if needed identify who gave statement)*
17. OFFICER'S STATEMENT. **Must attach a detailed, signed and dated statement. State how the action violated the regulations or compliance agreement cited in Item 2. Describe fully the facts of the violation from discovery through disposition of pest risk including when, who, what, and where.**
18. SIGNATURE OF INITIATING OFFICER
19. PRINTED NAME OF OFFICER AND WORK UNIT
20. DATE REPORT COMPLETED
21. OFFICER IN CHARGE COMMENTS *(Attach additional sheet, if needed)*
   List Previous Violations:
   Recommendations:
22. SIGNATURE OF OFFICER IN CHARGE
23. PRINTED NAME OF OFFICER IN CHARGE AND WORK UNIT
24. DATE SIGNED

PPQ FORM 518
(MAR 88)

Previous editions obsolete.

PART 4 - ORIGINATING OFFICER

EXAMPLE

Figure F-5 Example of PPQ Form 518 Report of Violation

PPQ 546 Agreement for Postentry Quarantine—State Screening Notice (7 CFR § 319.37)

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0579-0049. The time required to complete this information collection is estimated to average .25 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

OMB Approved 0579-0049

UNITED STATES DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE
PLANT PROTECTION AND QUARANTINE

AGREEMENT FOR POSTENTRY QUARANTINE STATE SCREENING NOTICE (7 CFR 319.37)

INSTRUCTIONS: PRESS HARD – you are making 4 copies. Complete section A. FORWARD PARTS 1, 2, AND 3 TO THE STATE REGULATORY OFFICIAL IN THE STATE WHERE THE PLANT MATERIAL WILL BE GROWN. Refer to the addresses on the reverse of Part 4. Retain Part 4 for your file.

1. Name and Address of Applicant

Telephone No.

2. Scientific Name of Plant	3. Quantity	4. Country of Origin

5. ACTUAL LOCATION WHERE MATERIAL WILL BE GROWN, INCLUDING COUNTRY (Please be specific. Show street address of property, or if no number, describe location of property in relation to roads and/or landmarks. Do NOT use post office box numbers.

AGREEMENT

As a condition of importing nursery stock governed by postentry quarantine provisions of the Nursery Stock Plants regulation (7 CFR 319.37-7), the following requirements must be met.

a. All plant material will be grown on premises supervised and controlled by me, located as specified in the Growing Locations section, and will not be moved or distributed without prior written permission of the appropriate State or Territory Official and the Coordinator, Postentry Quarantine Program, Riverdale, MD.

b. Properly identified officers, either Federal and/or State, will be given access to the premises listed in the Growing Locations section during regular business hours.

c. No increase of these plants by cutting, grafting, suckers, flowers, seeds, or air layers will be made; there will be no distribution of the plants or increase; and no cutting of flowers for sale will be made until the plants are released from postentry quarantine, or written permission of the (as in the first condition above).

d. The plant material and all increase there from will be labeled by specific plant name, port accession number, and date of importation.

e. The plant material will be separated from domestic stock of the same genus including such stock on adjoining premises, by no less than 3 meters (approximately 10 feet); and will be separated from other imported plants by the same distance.

f. Any treatments prescribed by the officer including destruction of the quarantined plant material or other plants growing on the premises will be complied with to prevent the dissemination of a plant pest.

g. The appropriate State or Territory Official will be notified in writing within 30 days when any abnormality is noticed in the plant material or if the plant material dies. Dead plants will be retained and collected by the officer for analysis.

h. Notification of change of address will be sent to the appropriate State or Territory Official and the Coordinator, Postentry Quarantine Program, Riverdale MD.

i. Plants of *Rubus* spp. from Europe will be grown in a screenhouse (16 mesh per inch minimum); plants of *Chrysanthemum* spp., *Dendranthema* spp., *Leucanthemalla serotina, Nipponanthemum nipponicum, Dianthus* spp., and *Hydrangea* spp. will be grown in a greenhouse or other enclosed building.

j. The postentry requirements will be applied to *Chrysanthemum* spp. for 6 months after importation, to *Dianthus* spp. for 1 year after importation, to *Hydrangea* spp. for 9 months after importation, to *Humulus* spp. (hops), a meristem culture of the imported plant will be observed for 6 months, and the original plant will be destroyed after the meristem culture is established. After the 6-month observation, the meristem culture-generated plant must remain in postentry quarantine for an additional year. All other plants under the postentry quarantine program will be observed and grown for 2 years after importation.

I, as the responsible agent, have read this agreement and agree to the above conditions, and understand that violation of this agreement will result in the cancellation of my postentry permit.

6. SIGNATURE OF APPLICANT	7. DATE SIGNED

SECTION B- TO BE COMPLETED BY STATE OFFICIAL

8. SITE

☐ APPROVED ☐ DISAPPROVED (If Disapproved State Reason Below) ☐ NOT SCREENED

RETAIN PART 3 FOR YOUR FILE

9. SIGNATURE OF STATE OFFICIAL	10. DATE SIGNED	State Official: Forward this application to: U.S. Department of Agriculture, APHIS Plant Protection and Quarantine 4700 River Road, Unit 136 Riverdale, Maryland 20737-1236

PPQ Form 546
JUL 2009

Previous edition obsolete.

Warning: Any alteration, forgery, or unauthorized use of this document is subject to civil penalties of up to $250,000 (7 U.S.C. 7734(b)) or punishable by a fine of not more than $10,000, or imprisonment of not more than 5 years, or both (18 U.S.C. 1001)

Figure F-6 Example of PPQ Form 546 Agreement for Postentry Quarantine—State Screening Notice (7 CFR § 319.37) (page 1 of 2)

Instruction for Completing PPQ Form 546
Agreement for Postentry Quarantine State Screening Notice

Note: Please TYPE or PRINT legibly to complete this form.

1. Enter the name of the company representative who is responsible for the shipment, the company name, and a street address. If you have a Post Office box for mail deliveries, add this to the street address in this box.
2. Enter the scientific (Latin) name of each plant you wish to import. If you do not know the scientific name(s), enter the English common name(s).
3. Enter the maximum number of plants/cuttings you and the State inspector consider appropriate for the growing you have selected during the quarantine period for the genus or genera you are importing.
4. Enter the country or countries from which the product is originally being shipped.
5. Enter the specific location – street address (if available), city, county, and State – where the plant material will be grown for the duration of the quarantine period. If no street address is available, you and the State inspector must determine how to describe the location in detail (GPS coordinates can be used).

STOP. Contact your State Plant Regulatory Official to set up an appointment for a site inspection. See the National Plant Board website at http://www.nationalplantboard.org/ for contact information for your State's Regulatory Official.

6. After the site inspection and consultation, the person named in Block 1 must sign the application.
7. Enter the date the application was completed and signed.

The State Regulatory Official will complete the form and submit it to USDA, APHIS, Plant Protection and Quarantine (full address on bottom of form).

Figure F-6 Example of PPQ Form 546 Agreement for Postentry Quarantine—State Screening Notice (7 CFR § 319.37) (page 2 of 2)

NOTICE

Sets of PPQ 546 dated prior to January 1998 are obsolete and **MUST** be discarded. The State should contact the SPHD to order new forms, or download from the Web site.

Routing and Distribution of PPQ Form 546

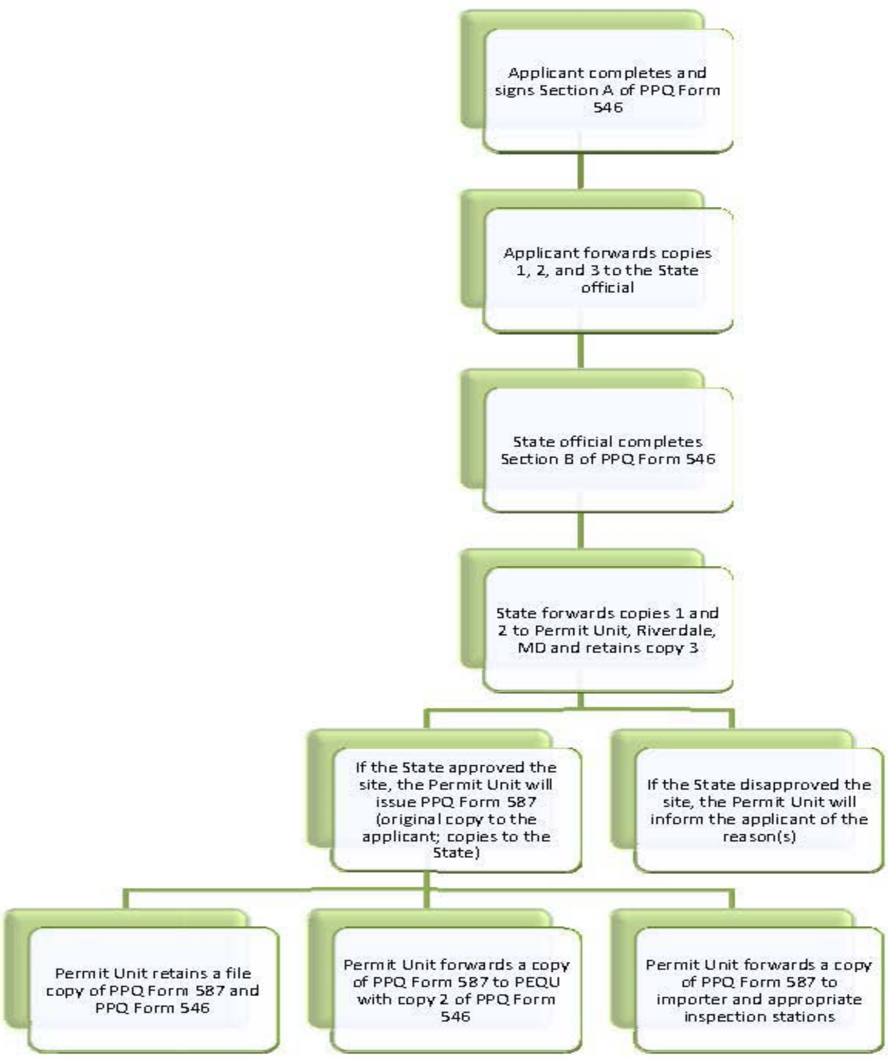
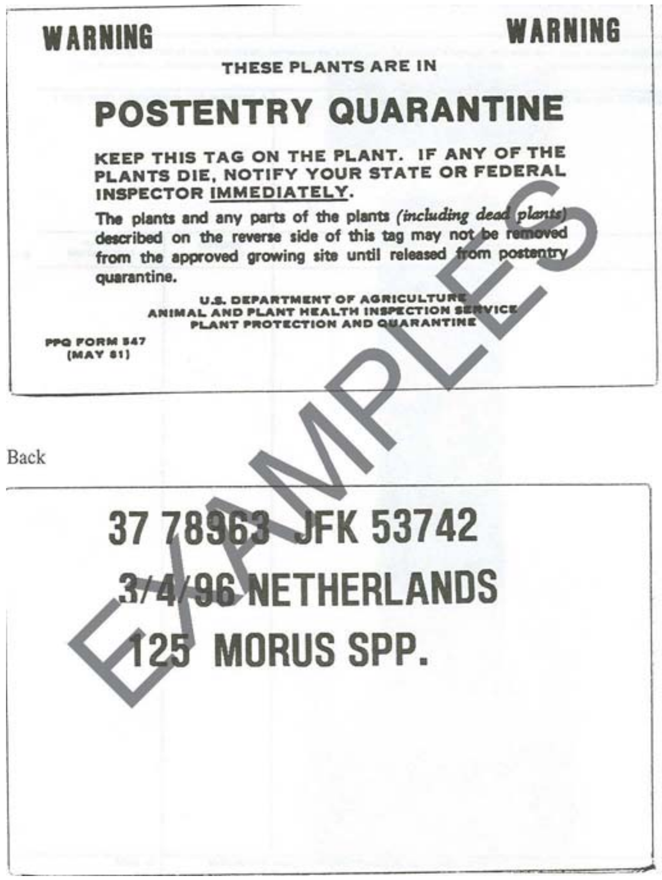


Figure F-7 Routing and Distribution of PPQ Form 546

PPQ Form 547 Postentry Quarantine Tag



WARNING WARNING

THESE PLANTS ARE IN

POSTENTRY QUARANTINE

KEEP THIS TAG ON THE PLANT. IF ANY OF THE PLANTS DIE, NOTIFY YOUR STATE OR FEDERAL INSPECTOR IMMEDIATELY.

The plants and any parts of the plants *(including dead plants)* described on the reverse side of this tag may not be removed from the approved growing site until released from postentry quarantine.

U.S. DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE
PLANT PROTECTION AND QUARANTINE

PPQ FORM 547
(MAY 81)

Back

37 78963 JFK 53742
3/4/96 NETHERLANDS
125 MORUS SPP.

Figure F-8 Example of PPQ Form 547 Postentry Quarantine Tag

PPQ Form 569 Release from Postentry Quarantine

NOTICE

This form is **only** issued by the National Coordinator, PEQP and the PEQ Coordinator for Hawaii, Guam, and CNMI in Honolulu, HI.

PPQ Form 587 Application for Permit to Import Plants or Plant Products

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a valid OMB control number. The valid OMB control numbers for this information collection are 0579-0049, 0172, 0173, and 0319. The time required to complete this information collection is estimated to average .5 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

OMB APPROVED
0579-0049, 0172,
0173, 0293, and 0319

U.S. DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE
PLANT PROTECTION AND QUARANTINE

APPLICATION FOR PERMIT TO IMPORT PLANTS OR PLANT PRODUCTS

INSTRUCTIONS: PLEASE TYPE OR PRINT CLEARLY. PERMITS ARE NOT ISSUED TO P.O. BOXES. READ THE ENTIRE APPLICATION BEFORE COMPLETING. ATTACH ADDITIONAL SHEETS OF PAPER IF MORE SPACE IS NEEDED.

FORWARD COMPLETED APPLICATION TO:
USDA-APHIS-PPQ
Permit Unit
4700 River Road, Unit 133
Riverdale, MD 20737-1236
1-877-770-5990; FAX: (301) 734-5786

1. NAME AND UNITED STATES ADDRESS OF U.S. RESIDENT/LEGAL ALIEN:

APPLICANT'S NAME:

ORGANIZATION NAME:

U.S. ADDRESS (*Include City, State, and ZIP Code*):

PHONE: FAX:

E-MAIL:

MAILING ADDRESS (*if different than physical address*):

2. PLANTS OR PLANT PRODUCTS TO BE IMPORTED:

Country of Origin (*Province or territory, if applicable*)	Scientific Names of Plants or Plant Products	Plant Parts (*seeds, cuttings, rhizomes, plants, bulbs, fruits, etc.*)	U.S. Port or Ports of Arrival

3. INTENDED USE: ☐ Plants/parts for planting (*Nursery stock*) ☐ Small lots of seed ☐ Fruit and vegetables ☐ Other

4. MEANS OF IMPORTATION: ☐ Mail or Express carrier ☐ Cargo shipment ☐ Personal baggage or car

5. SIGNATURE OF APPLICANT: 6. PRINTED NAME OF APPLICANT: 7. DATE:

PPQ FORM 587 (MD)
JUL 2009

WARNING: Any alteration, forgery, or unauthorized use of this document is subject to civil penalties of up to $250,000 (7 U.S.C. 7734(b)) or punishable by a fine of not more than $10,000, or imprisonment of not more than 5 years, or both (18 U.S.C. 1001).

Clear Form

Figure F-9 Example of PPQ Form 587 Application for Permit to Import Plants or Plant Products (page 1 of 2)

Instructions for completing PPQ Form 587
Application for Permit to Import Plants or Plant Products

Please TYPE or PRINT legibly to complete. You must complete all of the boxes.

1. Enter the name and street address of the person responsible for the importation. The applicant must be a United States resident. Enter the organization or company name, if applicable. A physical address of the facility or business is required. You may include a post office box address **in addition** to the street address for mailing purposes. Enter your daytime telephone number, including the Area Code. Enter your facsimile number, including the Area Code. Enter your e-mail address if applicable.

2. In the first column, enter a country or countries (if from Canada include Province, if from Mexico include State) from which you want to import the plants or plant products (the term "**various**" will **not** be accepted). In the second column, enter the scientific (Latin) name of each plant. If you do not know the scientific name(s), try to find out from the exporter. As a last resort, enter the English common name(s). In the third column, enter the type of plant parts you plan to import for each species. In the fourth column, enter the City and State of the preferred port(s) of arrival. If you do not know the port, enter "N/A." (Check your permit when you receive it for the approved ports.)

3. Check the appropriate box. Select "Plants for planting", if the plants/plant parts you want to import will be planted or sold for planting. Select "Small lots of seed" if you want to import under the small lots of seed program (see below*). Select "Fruits and Vegetables" if you are importing fruits and vegetables for consumption or resale. Select "Other" if the article you want to import does not fall into any of the other categories. List the category or additional information needed to describe the article (i.e., Cut flowers, broomcorn, etc…). * **Special instructions for small lots of seed:** Small lots of eligible seed may be imported without a phytosanitary certificate with a written permit. See the permit unit website (http://www.aphis.usda.gov/import_export/plants/plant_imports/ smalllots_seed.shtml) for help in determining eligibility. In part #2 list the seed species and countries from which you want to ship each species. If the list of species and/or countries of origin is long, you may enter "eligible taxa." By using this option, you are accepting responsibility for determining the eligibility of the seeds. A permit is issued for taxa that are enterable with no restrictions beyond port of entry inspection. If port of entry inspectors find prohibited or restricted seeds in your shipment, they will remove the ineligible kinds.

4. Check the appropriate box or boxes that apply to the means of importation.

5. The applicant named in box #1 must sign the form.

6. Printed name of person who signed the form.

7. Enter the date the form is completed and signed.

If you attach additional sheets of paper, type or print PPQ Form 587, the applicant's name, and the company name at the top of each page.

Send the completed application by facsimile to (301) 734-5786, or mail to:

USDA-APHIS-PPQ
Permit Unit
4700 River Road, Unit 133
Riverdale, MD 20737-1236

Call our automated phone number at 1-877-770-5990 if you have questions.

Figure F-9 Example of PPQ Form 587 Application for Permit to Import Plants or Plant Products (page 2 of 2)

NOTICE

This application is for all genera that are **not** prohibited or Postentry Quarantine.

PPQ Controlled Import Permit for Postentry Quarantine

APHIS Animal and Plant Health Inspection Service

Plant Protection & Quarantine

United States Department of Agriculture
Animal and Plant Health Inspection Service
4700 River Road
Riverdale, MD 20737

Controlled Import Permit for Postentry Quarantine
Regulated by 7 CFR 319.37-7 and 319.6

This permit was generated electronically via the ePermits system.

PERMITTEE NAME:	Jane Doe	**PERMIT NUMBER:**	PEXX-XX-XXXXX
COMPANY:	Doe Growers, Inc.	**APPLICATION NUMBER:**	PXXX-XXXXXX-XXX
ADDRESS:	12345 Main St. Anytown, USA 12345	**DATE ISSUED:**	06/01/2013
PHONE:	(800) 888-5555	**DATE AMENDED:**	
FAX:	(800) 888-5550	**EXPIRES:**	**06/01/2016**

DESIGNATED PLANT INSPECTION STATIONS: AZ, Nogales; CA, Hawthorne; CA, San Diego; CA, San Francisco; FL, Miami; FL, Orlando; GA, Atlanta; GU, Agana; HI, Honolulu; MD, Beltsville; NJ, Linden; NY, Jamaica; PR, Carolina; TX, Humble; TX, Los Indios; WA, SeaTac

Under the conditions specified, this permit authorizes the following:

Commodity	Country(ies) of Origin	Maximum Quantity
Acer	New Zealand	1000

Approved Growing Locations

Address:	12345 Main St.
City, State:	Anytown, USA
County:	Washington
Latitude:	
Longitude:	
Growing Location Description:	

SPECIAL INSTRUCTIONS TO INSPECTORS

See permit conditions below

PERMIT CONDITIONS

THIS PERMIT AUTHORIZES THE IMPORTATION OF THE FOLLOWING POSTENTRY GENERA.

Please note that the import requirements listed below are subject to change at any time during the duration of this permit. Please refer to the Nursery Stock Restrictions (Plants for Planting) Manual at http://www.aphis.usda.gov/import_export/plants/manuals/ports/index.shtml for the current import requirements for the commodities you are importing.

Any person who violates the Plant Protection Act (PPA) of the United States, individuals or corporations who fail to comply with these conditions and authorizations, or who forge, counterfeit, or deface permits may be criminally or administratively prosecuted and found guilty of a misdemeanor which can result in penalties, a one-year prison term, or both. Additionally, any person violating the PPA may be assessed civil penalties of up to $250,000 per violation or twice the gross gain or gross loss for a violation that results in the person deriving pecuniary gain or a

Permit Number PEXX-XX-XXXXX

THIS PERMIT HAS BEEN APPROVED ELECTRONICALLY BY THE FOLLOWING PPQ HEADQUARTER OFFICIAL VIA EPERMITS.	DATE **06/01/2013**

WARNING: Any alteration, forgery or unauthorized use of this Federal Form is subject to civil penalties of up to $250,000 (7 U.S.C s 7734(b)) or punishable by a fine of not more than $10,000, or imprisonment of not more than 5 years, or both (18 U.S.C s 1001)

Page 1 of 4

EXAMPLE

Figure F-10 Example of a Controlled Import Permit for Postentry Quarantine (CIP) (page 1 of 4)

Animal and Plant Health Inspection Service

Plant Protection & Quarantine

pecuniary loss to another, whichever is greater. In addition, all current permits may be cancelled and future permit applications denied.

This APHIS-issued import permit only covers compliance with APHIS regulations and requirements. Therefore, this APHIS permit for the commodity to be imported does not reduce or eliminate the permittee's legal duty and responsibility to likewise comply with all other Federal and State regulatory requirements applicable to the commodity to be imported.

1. All plant material will be grown on premises supervised and controlled by me, located as specified in the Growing Locations section, and will not be moved or distributed without prior written permission of the appropriate State or Territory Official and the Coordinator, Postentry Quarantine Program, Riverdale, MD.

2. Properly identified officers, either Federal and/or State, will be given access to the premises listed in the Growing Locations section during regular business hours.

3. No increase of these plants by cuttings, grafting, suckers, flowers, seeds or air layers will be made; there will be no distribution of the plants or increase; and no cutting of flowers for sale will be made until the plants are released from postentry quarantine, or written permission of the (as in the first condition above).

4. The plant material and all increase there from will be labeled by specific plant name, port accession number, and date of importation.

5. The plant material will be separated from domestic stock of the same genus including such stock on adjoining premises, by no less than 3 meters (approximately 10 feet); and will be separated from other imported plants by the same distance.

6. Any treatments prescribed by the officer including destruction of the quarantined plant material or other plants growing on the premises will be complied with to prevent the dissemination of a plant pest.

7. The appropriate State or Territory Official will be notified in writing within 30 days when any abnormality is noticed in the plant material or if the plant material dies. Dead plants will be retained and collected by the officer for analysis.

8. Notification of change of address will be sent to the appropriate State or Territory Official and the Coordinator, Postentry Quarantine Program, Riverdale MD.

9. Plants of Rubus spp. from Europe will be grown in a screenhouse (16 mesh per inch minimum); plants of Chrysanthemum spp. Dendranthema spp., Leucanthemella serotina, Nipponanthemum nipponicum, Dianthus spp., and Hydrangea spp. will be grown in a greenhouse or other enclosed building.

10. The postentry requirements will be applied to Chrysanthemum spp. for 6 months after importation, to Dianthus spp. for 1 year after importation, to Hydrangea spp. for 9 months after importation, to Humulus spp. (hops), a meristem culture of the imported plant will be observed for 6 months, and the original plant will be destroyed after the meristem culture is established. After the 6-month observation, the meristem culture-generated plant must remain in postentry quarantine for an additional year. All other plants under the postentry quarantine program will be observed and grown for 2 years after importation.

11. APHIS will consider authorizing release of restricted plant materials in postentry quarantine before the end of 2 consecutive calendar years under the following conditions:

1) All restricted plant materials under PEQ targeted for release shall meet the inspection and testing requirements for the plant pests and pathogen(s) of concern and must complete 2 sequential growing season inspections occurring within 2 consecutive calendar years;
2) The results of the inspections and testing shall be negative for the plant pests and pathogen(s) of concern; and
3) The request shall be accompanied by a written recommendation from the SPRO or their designated representative.

12. POSTENTRY PLANT MATERIAL LISTED BELOW
(SPECIAL PROVISIONS MAY APPLY)

The plant material (listed above) you wish to import under postentry quarantine is to be grown at (site listed above) in accordance with the agreement dated June 25, 2013.

Permit Number P EXX-XX-XXXXX

THIS PERMIT HAS BEEN APPROVED ELECTRONICALLY BY THE FOLLOWING PPQ HEADQUARTER OFFICIAL VIA EPERMITS.	DATE 06/01/2013

WARNING: Any alteration, forgery or unauthorized use of this Federal Form is subject to civil penalties of up to $250,000 (7 U.S.C s 7734(b)) or punishable by a fine of not more than $10,000, or imprisonment of not more than 5 years, or both (18 U.S.C s 1001)

Page 2 of 4

Figure F-10 Example of a Controlled Import Permit for Postentry Quarantine (CIP) (page 2 of 4)

Animal and Plant Health Inspection Service

Plant Protection & Quarantine

13. Under the Plant Protection Act, individuals or corporations who fail to comply with the following conditions andauthorizations, or who forge, counterfeit, or deface permits or shipping labels may receive civil or criminal penalties,and may have all current permits cancelled and future permit applications denied. Additionally, the permittee is responsible for ensuring that plant materials imported under this permit comply with all applicable requirements stated in Title 7 Code of Federal Regulations Part 319.37.

14. A phytosanitary certificate must accompany all propagative material imported under this permit.

15. Immediately upon arrival of the plant material at the port of entry, the importer will notify Plant Protection and Quarantine of the arrival using a manifest, customs entry document, commercial invoice, waybill, brokers document, or PPQ Form 368 which is available on this website:
http://www.aphis.usda.gov/library/forms/index.shtml#ppq

16. A typed or legibly printed list/invoice must accompany each shipment, and must include the name of the collector/shipper, the botanical names (genus and species) listed alphabetically, as well as the country of origin, and country shipped from, for each taxon.

17. The permittee must instruct the supplier to label each container with the genus and species name of plants within. For containers holding more than one species, each species must be labeled separately.

18. If the plant material shipped under the Postentry Quarantine (PEQ) program is delivered to the permit holder or to the approved PEQ site/facility prior to PPQ inspection AND is not accompanied by one postentry yellow tag (PPQ Form 547) and twist tie per plant genus, and is not accompanied by the PPQ Form 236 from the USDA Plant Inspection Station, the permit holder is required to immediately:

a) Hold and properly safeguard the entire plant shipment, including any other non-postentry required plants in its original package/container; and

b) Contact one of the following immediately for instructions in order to obtain proper clearance of the shipment: State Department of Agriculture officials, the nearest USDA Plant Inspection Station, or the USDA APHIS PPQ postentry liaison. Contact information can be found by accessing the Postentry Quarantine Manual Appendix A,B & C through the link provided below. Plant shipments will be sent either to a designated PIS or the nearest PIS at the importer's expense. Failure to comply with this and any other USDA regulations and permit conditions as specified may result in the revocation of the permit and civil penalties.

http://www.aphis.usda.gov/import_export/plants/manuals/online_manuals.shtml

19. Permit holder shall ensure that this permit is valid while each imported plant shipment is in postentry quarantine until its final release and PPQ form 569 is issued by the PEQ National Coordinator.

20. The shipment must be free from soil, other foreign matter or debris, prohibited plants, noxious weed seeds, and living organisms such as parasitic plants, pathogens, insects, snails, and mites. Material found to be commingled with prohibited or infested material will be subject to the same action (i.e. re-export, destruction, etc...) as the prohibited or infested material.

21. Plants for planting which have been wrapped, coated, dipped, or sprayed, or otherwise packaged in plastic, or other impermeable material that may prevent adequate inspection or treatment may be refused entry.

22. All wood packing material (WPM) present with this shipment must meet the requirements of the importing and destination country and is subject to ISPM 15 treatment and IPPC stamp requirements and enforcement as stated in 7CFR 319.40-3(b).

23. USDA, APHIS, PPQ and CBP-AS have the option, based on its inspection findings, to order treatment, re-exportation or destruction of a shipment, or a portion of a shipment.

Permit Number P EXX-XX-XXXXX

THIS PERMIT HAS BEEN APPROVED ELECTRONICALLY BY THE FOLLOWING PPQ HEADQUARTER OFFICIAL VIA EPERMITS.	DATE 06/01/2013

WARNING: Any alteration, forgery or unauthorized use of this Federal Form is subject to civil penalties of up to $250,000 (7 U.S.C. s 7734(b)) or punishable by a fine of not more than $10,000, or imprisonment of not more than 5 years, or both (18 U.S.C. s 1001)

Page 3 of 4

Figure F-10 Example of a Controlled Import Permit for Postentry Quarantine (CIP) (page 3 of 4)

Animal and Plant Health Inspection Service

Plant Protection & Quarantine

24. When shipments are to be imported by mail, the permittee should request a green and yellow mailing label for each parcel. Instructions for its use appear on the reverse side of the label. If you are importing plants and seeds by mail (including express carrier parcel shipments), please instruct your supplier to attach to your parcel(s) the green and yellow labels provided with your permit. It is especially important that the permittee's name, address, telephore number, and permit number be enclosed with each parcel. Instruct your supplier to place only green and yellow labels, and NOT your name or address, on the outside of the parcel. Green and yellow labels should be used only for mail importation. You may request for PPQ Form 508 (Green/Yellow labels) on-line through ePermits under the "My Shipments/Labels" feature. Otherwise, send your request to GreenandyellowPlantslabelrequest@aphis.usda.gov. Specify the approved port(s) listed on the permit where you wish the plant materials sent and the total number of labels needed in a multiple of eight. The requested permit labels will be sent to you through a bonded carrier.

25. If the shipment is to be delivered by an express carrier, such as DHL, FedEx, UPS, etc., the recipient's name and address must be the same as the name and address on the PPQ permit label. In addition, please include inside the box a U.S. domestic shipping label from the express carrier of your choice with your shipping account number. These actions will help to ensure your package arrives at your designated final destination after the USDA Plant Inspection Station has inspected and cleared the package.

26. Shipments must be imported and presented for inspection at a USDA Plant Inspection Station (PIS) at a designated port listed on the permit or the green and yellow label, if applicable or required. If a shipment arrives at a port without a plant inspection station, any subsequent movement to a plant inspection station, or any transfer and /or transloading, must be approved by the USDA and/or CBP.

27. All costs and arrangements are the responsibility of the importer.

28. This permit must be utilized solely by the permittee. You must keep your permit valid for the duration that plant materials are in your possession. If the permit holder leaves the institution. a new individual who assumes responsibility for continued maintenance should obtain a permit prior to the permittee's departure. If any information changes (i.e. telephone number or address), you must notify our office immediately with the changes.

END OF PERMIT CONDITIONS

EXAMPLE

Permit Number P EXX-XX-XXXXX

THIS PERMIT HAS BEEN APPROVED ELECTRONICALLY BY THE FOLLOWING PPQ HEADQUARTER OFFICIAL VIA EPERMITS.	DATE **06/01/2013**

WARNING: Any alteration, forgery or unauthorized use of this Federal Form is subject to civil penalties of up to $250,000 (7 U.S.C s 7734(b)) or punishable by a fine of not more than $10,000, or imprisonment of not more than 5 years, or both (18 U.S.C s 1001)

Page 4 of 4

Figure F-10 Example of a Controlled Import Permit for Postentry Quarantine (CIP) (page 4 of 4)

Witness Statements

FILL IN STATEMENT

Date

I, ________________________ voluntarily make the following statement to ______________________, who has identified himself/herself to me as a Federal officer of the Animal and Plant Health Inspection Service, U.S. Department of Agriculture, knowing that it may be used as evidence.

Statement — use as many pages as necessary)

(NOTE: Do not use the following paragraph if the statement is handwritten, only use if the statement is typed.)

I have read the foregoing statement and vouch that the information contained therin is true to the best of my knowledge. I have been offered an opportunity to add to, delete from, or change anything herein that I feel is erroneous or incorrect. I have been offered no remuneration for making this statement and make it of my own free will.

____
Signature of PPQ Officer

____
Signature of Person Making Statement

____
Address

____

____

Figure F-11 Example of a Witness Statement

Appendix G

Postentry Quarantine Regulation 7 CFR 319.37-7

(a) The following restricted articles, from the designated countries and localities, and any increase therefrom must be grown under postentry quarantine conditions specified in paragraphs (c) and (d) of this section, and may be imported or offered for importation into the United States **only**:

(1) If destined for a State that has completed a State postentry quarantine agreement in accordance with paragraph (c) of this section;

(2) If a postentry quarantine growing agreement has been completed and submitted to Plant Protection and Quarantine in accordance with paragraph (d) of this section. The agreement must be signed by the person (the importer) applying for a written permit for importation of the article in accordance with §319.37-3; and,

(3) If Plant Protection and Quarantine has determined that the completed postentry quarantine growing agreement fulfills the applicable requirements of this section and that services by State inspectors are available to monitor and enforce the postentry quarantine.

(c) *State Postentry quarantine agreement.* (1) Articles required to undergo postentry quarantine in accordance with this section may only be imported if destined for postentry quarantine growing in a State which has entered into a written agreement with the Animal and Plant Health Inspection Service, signed by the Administrator or his or her designee and by the State Plant Regulatory Official. In accordance with the laws of individual States, inspection and other postentry quarantine services provided by a State may be subject to charges imposed by the State.

(I) The following States have entered into a postentry quarantine agreement in accordance with this paragraph:

[Reserved]

(2) In any such written agreement, the State shall agree to:

(i) Establish State regulations and requirements prior to the effective date of the agreement and enforce such State and Postentry Quarantine Manual regulations and requirements necessary to inspect sites and plants growing in postentry quarantine and to monitor and enforce compliance with postentry quarantine growing in accordance with this section;

(ii) Review pending permit applications for articles to be grown under postentry quarantine conditions in the States, upon request of Plant Protection and Quarantine, and report to the Permit Unit of Plant Protection and Quarantine whether the State would be able to provide inspection and monitoring services for the proposed postentry quarantine.:

(iii) Provide the services of State inspectors to: inspect sites to be used for postentry quarantine; report to the Permit Unit of Plant Protection and Quarantine whether the site is of adequate size to contain the number of plants proposed for importation, including potential increase if increase is allowed; inspect plants for evidence of exotic pests at least once during the first year and once during the second year for plants required to be grown in postentry quarantine for 2 years, and at least once for plants required to be grown in quarantine for less than 2 years and monitor and enforce compliance with the requirements of this section during the use of the sites for postentry quarantine;

(iv) Report to the Postentry Quarantine Unit of Plant Protection and Quarantine any evidence of plant pests that are not known to exist in the United States and that are found at a postentry quarantine site by State inspectors; recommend to Plant Protection and Quarantine safeguards or mitigation measures to control the pests; and supervise the application of safeguards or mitigation measures approved by Plant Protection and Quarantine; and

(v) Report to the Postentry Quarantine Unit of Plant Protection and Quarantine any propagation or increase in the number of plants that occurs during postentry quarantine.

(3) In any such written agreement, the Administrator shall agree to:

(i) Seek State review of permit applications for postentry quarantine material in that State, and issue permits only after determining that State services are available to monitor the postentry quarantine;

(ii) Upon request of the State, provide training, technical advice, and pest identification services to State officials involved in providing postentry quarantine services in accordance with this section;

(iii) Notify State officials, in writing and within ten days of the arrival, when plant material destined for postentry quarantine in their State arrives in the United States, and notify State officials in writing when materials in postentry quarantine may be released from quarantine in their State.

(4) *Termination of State postentry quarantine agreement*. A State postentry quarantine agreement may be terminated by either the Administrator or the State Plant Regulatory Official by giving written notice of termination to the other party. The effective date of the termination will be 60 days after the date of actual receipt of notice, with regard to future importation to that State of articles requiring postentry quarantine in accordance with this section. When a postentry quarantine agreement is terminated by either the State Plant Regulatory Official or the Administrator, APHIS and the affected State shall continue to provide postentry quarantine services in accordance with the postentry quarantine agreement, until the time the plant material is eligible to be released from quarantine, for all postentry quarantine material already in the State, and for all postentry quarantine material that arrives in the State prior to the effective date of termination.

(d) *Postentry quarantine growing agreements*. Any restricted article required to be grown under postentry quarantine conditions, as well as any increase therefrom, shall be grown in accordance with a postentry quarantine growing agreement signed by the person (the importer) applying for a written permit in accordance with §319.37-3 for importation of the article and submitted to Plant Protection and Quarantine. On each postentry quarantine growing agreement, APHIS shall also obtain the signature of the State Plant Regulatory Official for the State in which regulated articles covered by the agreement will be grown. The postentry quarantine growing agreement shall specify the kind, number, and origin of plants to be imported, and shall certify to APHIS and to the State in which the articles are grown that the signed of the agreement will comply with the following conditions for the period of time specified below:

(1) To grow such article or increase therefrom only on specified premises owned, rented, or otherwise in possession of the importer, within a space of dimensions designated by an inspector, and to move, propagate, or allow propagation of the article or increase therefrom or parts thereof only with the written permission of the National Coordinator for postentry quarantine in Beltsville, MD or the Coordinator of postentry quarantine for Hawaii, Guam, and CNMI in Honolulu, HI after approval by the State Plant REgulatory Officer or representative:

(2) To permit an inspector to have access to the specified premises for inspection of such article during regular business hours;

(3) To keep the article and any increase therefrom identified with a label showing the name of the article, port accession number, and date of importation;

(4) To keep the article separated from any domestic plant or plant product of the same genus by no less than 3 meters (approximately 10 feet); and from any other imported plant or plant product by the same distance;

(5) To allow or apply remedial measures (including destruction) determined by an inspector to be necessary to prevent the spread of an injurious plant disease, injurious insect pest, or other plant pest;

(6) To notify an inspector, orally or in writing, within 30 days of the time the importer or the person in charge of the growing site finds any abnormality of the article, or the article dies or is killed by the importer, the person in charge of the growing site, or any other person; to retain the abnormal or dead article for at least 60 days following that date of notification; an to give the abnormal or dead article to an inspector upon request;

(7) To grow the article or increase therefrom, if an article or *Rubus* spp. (cloudberry, blackberry, boysenberry, dewberry, loganberry, raspberry) from Europe, only in a screenhouse with screening of a minimum of 16 mesh per inch;

(8) To grow the article or increase therefrom, if an article of *Chrysanthemum* spp. (chrysanthemum) or *Dianthus* spp. (carnation, sweet-william), only in a greenhouse or other enclosed building; and

(9) To comply with the above conditions for a period of 6 months after importation for an article of *Chrysanthemum* spp. (chrysanthemum), for a period of 1 year after importation for an article of *Dianthus* spp. (carnation, sweet-william), and for a period of 2 years after importation for any other such articles.

(e) A completed postentry quarantine agreement (PPQ form 546) signed by both the applicant and the State Plant Regulatory Officer or representative must be forwarded to the Permits Unit in Riverdale, MD to obtain a written permit for an article required to be grown under postentry quarantine conditions.

(f) *Inspector-ordered disposal, movement, or safeguarding of restricted articles; costs and charges, civil and criminal liabilities*.

(1) *Growing at unauthorized sites*. If an inspector determines that any article subject to the postentry quarantine growing requirements of this section, or any

appropriately authorized increase therefrom, is being grown at an unauthorized site, the inspector may file an emergency action notification (PPQ Form 523) with the owner of the article or the person who owns or is in possession of the site on which the article is being grown. The person named in the form 523 must, within the time specified in form 523, sign a postentry quarantine growing agreement, destroy, ship to a point outside the United states, move to an authorized postentry quarantine site, and/or apply treatments or other safeguards to the article, the increase therefrom, or any portion of the article or the increase therefrom, as prescribed by an inspector to prevent the introduction of plant pests into the United States. In choosing which action to order and in setting the time limit for the action, the inspector shall consider the degree of pest risk presented by the plant pest(s) associated with the kind of article (including increase therefrom), the types of other host materials for the pest in or near the growing site, the climate and season at the site in relation to the pest's survival, and the availability of treatment facilities.

(2) *Growing at authorized sites*. If an inspector determines that any article, or any increase therefrom, grown at a site specified in an authorized postentry quarantine growing agreement is being grown contrary to the provisions of this section, including in numbers greater than the number approved by the postentry quarantine growing agreement, or in a manner that otherwise presents a risk of introducing plant pests into the United States, the inspector shall issue an emergency action notification (PPQ form 523) to the person who signed the postentry quarantine growing agreement. That person shall be responsible for carrying out all actions specified in the emergency action notification. The emergency action notification may extend the time for which the articles and the increase therefrom must be grown under the postentry quarantine conditions specified in the authorized postentry quarantine growing agreement, or may require that the person named in the notification must destroy, ship to a point outside the United States, or apply treatments or other safeguards to the article, the increase therefrom, or any portion of the article or the increase therefrom, within the time specified in the emergency action notification. In choosing which action to order and in setting the time limit for the action, the inspector shall consider the degree of pest risk presented by the plant pest(s) associated with the kind of article (including increase therefrom), the types of other host materials for the pest in or near the growing site, the climate and season at the site in relation to the pest's survival, and the availability of treatment facilities.

(3) *Costs and charges*. All costs pursuant to any action ordered by an inspector in accordance with this section shall be borne by the person who signed the postentry quarantine growing agreement (PPQ form 546) covering the site where the articles were grown, or if no such agreement was signed, by the owner of the articles at the growing site.

(4) *Civil and criminal liabilities*. Any person who moves an article subject to postentry quarantine growing requirements from the site specified for that article in an authorized postentry quarantine growing agreement, or who otherwise handles such an article contrary to the requirements of this section, shall be subject to such civil penalties and such criminal liabilities as are provided by 18 U.S.C. 1001, 7 U.S.C. 150gg and 163, or other applicable Federal statutes.

(g) *State*. As used in this section. “State” means each of the 50 States of the United States, the District of Columbia, Guam, Northern Mariana Islands, Puerto Rico, the Virgin Islands, of the United States, and all other territories and possessions of the United States.

(Approved by the Office of Management and Budget under control number 0579-0049)

(44 U.S.C. 35)[45 FR 31585, May 13, 1980; 45 FR 35305, May 27, 1980, as amended at 45 FR 81531. Dec. 11, 1980; 48 FR 57466, Dec. 30, 1983; 57 FR 43148, 43150, Sept. 18, 1992; 58 FR 38267, July 16, 1993; 58 FR 41124. Aug. 2, 1993; 59 FR 67610. Dec. 30, 19]

Appendix H

Plants Growing in Postentry Quarantine

Contents

Introduction

Use Table H-1 to determine when to look for symptoms of infections caused by bacteria, viruses, fungi, and cankers.

Table H-1 Causal Agent and Onset of Symptoms

If the causal agent is likely:	Then look for symptoms at this time of year:
Bacteria	Spring and early summer
Viruses	Cool weather (when leaves are first expanding)
Cankers	Year long
Fungi including leaf spots	Mid-summer to fall

Inspection Aid for Plants Growing in Postentry Quarantine

Table H-2 Inspection Aid for Plants Growing in Postentry Quarantine (page 1 of 18)

Host group:	Pathogen or disease:	Preferred inspection period:	Symtpoms:
Abelmoschus spp. (okra)	Cotton Leaf Curl Agent	After leaves are fully opened until 6 weeks after	**Leaves**: Conspicuous net-veinenations; on severely affected plants, leaves are small, thick, and curled downwards; also, on severely affected plant, may have "bunchy-top" appearance
Acacia spp.	*Uromycladium tepperianum* (Sacc.) McAlp. (rust)	Throughout growing season	**Leaves**: Gall–like masses along entire length **Branches**: Large rounded galls or areas coated with brown, powdery spores

Table H-2 Inspection Aid for Plants Growing in Postentry Quarantine (page 2 of 18)

Host group:	Pathogen or disease:	Preferred inspection period:	Symtpoms:
Acer spp. (maple)	*Xanthomonas acernea* (Ogawa) Burk (leaf disease)	After leaves are fully opened until autumn	**Leaves**: Irregular, water-soaked spotting; spots later turn pale gray to black; leaves turn black and shrivel
	Maple-Variegation Agent	After leaves are fully opened until 6 weeks after	**Leaves**: Yellow mottle mosaic peppered with very small, round, light-green spots; spots may coalesce to give chlorotic appearance
Actinidia spp. (kiwi–fruit)	*Pucciniastrum actinidiae* Hiratusuka (rust)	After leaves are fully opened	**Leaves**: Spots on lower surface, grouped or scattered on yellow or yellowish-brown discolored areas; mature pustules yellowish-brown to brown in color
Aesculus spp. (horsechestnut)	Horsechestnut- Variegation Agent	After leaves are fully opened until they color in autumn	**Leaves**: Yellow variegation
Althaea spp. (hollyhock)	Hibiscus Yellow Vein Mosaic Agent	When leaves are developing until leaves are fully opened	**Leaves**: Faint vein clearing (of young leaves) followed by swelling of the veins at several points on the underside of the leaves; swelling gradually extends to nearly all veins. As leaves grow, the swelling thickens and becomes twisted; thickened veins are deep green in color and appear opaque when seen against the light
Anacardium occidentale (fruit and nut list)	Inspect for any potential exotic pathogen	Various times of the year	*See* Plant Genera Subject to Postentry Quarantine on page E-1
Annona spp. (fruit and nut list)	Inspect for any potential exotic pathogens	Various times of the year	*See* Plant Genera Subject to Postentry Quarantine on page E-1
Artocarpus spp.	Inspect for any potential exotic pathogens	Various times of the year	*See* Plant Genera Subject to Postentry Quarantine on page E-1
Averrhoa carambola (fruit and nut List)	Inspect for any potential exotic pathogens	Various times of the year	*See* Plant Genera Subject to Postentry Quarantine on page E-1
Averrhoa spp.	Inspect for any potential exotic pathogens	Various times of the year	*See* Plant Genera Subject to Postentry Quarantine on page E-1
Berberis spp. (barberry)	*Puccinia graminis* Pers. (Black Stem Rust)	Between 5 and 9 weeks after leaves are fully opened	**Leaves**: Small, circular, yellowish to orange spots (up to 2 to 5 mm) on upper side; usually on the lower side are groups of orange-yellow horn or cup-like projections

Table H-2 Inspection Aid for Plants Growing in Postentry Quarantine (page 3 of 18)

Host group:	Pathogen or disease:	Preferred inspection period:	Symtpoms:
Blighia sapida (akee)	Okra Mosaic Virus	When leaves are developing until leaves are fully opened	**Leaves**: Chlorosis of the leaf veins and chlorosis of the lamina leaving thin, dark-green bands along the small leaf veins
Bromeliaceae (pine-apple family) (Postentry in HI **only**)	*Puccinia pitcairniae* Lagh.	All season	**Leaves**: Scattered or compact cinnamon-brown to blackish-brown lesions
	Puccinia tillandsiae Cummins and Pollack	All season	**Leaves**: Lesions in clusters yellow to golden-brown
	Uredo nidularii P. Henn.	All season	**Leaves**: Yellowish to cinnamon-brown lesions arranged in rows in groups
	Ustilago tillandsiae Patterson	During flowering period	**Inflorescences**: Powdery black sori destroying inflorescences
Brugmansia spp.	Datura Colombian Virus	Spring and early summer	**Leaves**: 1) Veinbanding or chlorotic flecking followed by mottling; 2) may become rugose and slightly distorted
Carica spp.	Inspect for any potential exotic pathogen	Various times of year	*See* Plant Genera Subject to Postentry Quarantine on page E-1
Cedrus spp. (cedar)	*Phacidiopycnis pseudotsuga* (M. Wils.) Hahn (Douglas Fir Canker)	All season	**Terminal buds and shoots**: Die-back branches or trunk: Girdling up to 6 inches wide
Ceratonia siliqua	Inspect for any potential exotic pathogen	Various times of year	*See* Plant Genera Subject to Postentry Quarantine on page E-1

Table H-2 Inspection Aid for Plants Growing in Postentry Quarantine (page 4 of 18)

Host group:	Pathogen or disease:	Preferred inspection period:	Symtpoms:
Chaenomeles spp. (flowering quince)	Quince Sooty Ringspot Agent	Up to 6 weeks after leaves are fully opened	**Young leaves**: 1) Show epinasty (curled sharply downwards); 2) Veinlets-necrosis and short lengths become blackened; black pigments develop in cuticle bordering veins or around pale yellow spots giving superficial appearance of "sooty mold"; 3) Vein clearing and yellowing
	Quince Yellow Blotch Agent	Up to 6 weeks after leaves are fully opened	**Leaves**: Large chlorotic blotches
	Quince Stunt Agent	Up to 6 weeks after leaves are fully opened	**Leaves**: Reduced in size, puckered, and marked by translucent chlorotic spots; **Plants**: Show no growth; also, show various degree of die-back (Smith)
	Gymnosporangium asiaticum Miyabe ex Yamada (rust)	After leaves are fully opened	**Leaves**: Upper surface: orange–yellow spots; Lower surface: brown spots with yellowish-red margins; telia occur on juniperus needles
	Apple Ring Spot Agent	When fruits are about 3 cm in diameter until harvest	Occurs **only** on fruits: Starts as small, brown areas; develops into irregular patches of varying shades of brown (to reddish brown) with rough russeted surface (sometimes intersected by little cracks) and scaly margin. As fruit ripens, a brown halo, or a series of concentric rings, forms around lesions. The skin around the halo (or rings) is light-green or yellow even on red fruits
Chrysanthemum spp. (*Dendranthema* spp.)	*Puccinia horiana* P. Henn. (White Rust of Chrysanthemum)	When leaves are fully out. Spring: 3 to 6 weeks after planting and again later in the season; summer	**Leaves**: Upper surface—greenish-yellow spots. Lower surface—raised, waxy, whitish-yellow to pink pustules. **Young shoots**: Wilt and die
Chrysobalanus icaco	Inspect for any potential exotic pathogen	Various times of year	*See* Plant Genera Subject to Postentry Quarantine on page E-1
Chrysophyllum spp.	Inspect for any potential exotic pathogen	Various times of year	*See* Plant Genera Subject to Postentry Quarantine on page E-1
Corylus spp. (except *C. avellana*)	Inspect for any potential exotic pathogen	Various times of year	*See* Plant Genera Subject to Postentry Quarantine on page E-1

Table H-2 Inspection Aid for Plants Growing in Postentry Quarantine (page 5 of 18)

Host group:	Pathogen or disease:	Preferred inspection period:	Symtpoms:
Corylus Avellana (hazelnut)	Apple Proliferation Phytoplasma	Starting in the spring and throughout the season	General yellowing, weak growth, and dieback
Crataegus monogyna (English hawthorn)	*Gymnosporangium* spp. (rust)	After leaves are fully opened	**Leaves**: Brownish spots
Crataegus spp. (fruit bearing)	*Gymnosporangium* spp. (rust) and *Monilina fructigena* (Aderh. & Ruhl.) Honey (Brown Rot of Fruit)		
Crocosmia spp.	*Puccinia mccleanii*	When leaves are out	
	Uredo gladioli-buettneri Bub. (rust)	When leaves are out	
	Uromyces gladioli P. Henn (rust)	When leaves are out	**Leaves**: Telia in small, brown sori crowded together to form a crust
	Uromyces nyikensis Syd. (rust)	When leaves are out	**Leaves**: Telia in small, cinnamon-brown sori along veins sometimes on chlorotic spots
	Uromyces transversalis	When leaves are out	**Leaves**: Uredinia appear as powdery bright-orange sori on both leaf surfaces in linear series transversely across the leaf; telia initially surround the uredinia and are dark brown

Table H-2 Inspection Aid for Plants Growing in Postentry Quarantine (page 6 of 18)

Host group:	Pathogen or disease:	Preferred inspection period:	Symtpoms:
Cydonia spp. (quince)	*Guignardia piricola* (Nose) Yamamoto (leaf, branch, and fruit disease)	Spring to early summer for leaves; summer for fruit (if fruiting)	**Branches or trunk**: Lesions are round to elliptical, separated from healthy tissue by a crack or crevice around margin, and brown to gray **Fruit**: Spots are brown and depressed and sometimes with brownish ring
	Quince Sooty Ringspot Agent	Up to 6 weeks after leaves are fully opened	**Young leaves**: 1) Show epinasty (curled sharply downwards); 2) Veinlets-necrosis and short lengths become blackened; lack pigments develop in cuticle bordering veins or around pale yellow spots giving superficial appearance of “sooty mold”; 3) Vein clearing and yellowing
	Quince Yellow Blotch Agent	Up to 6 weeks after leaves are fully opened	**Leaves**: Large chlorotic blotches
	Quince Stunt Agent	Up to 6 weeks after leaves are fully opened	**Leaves**: Reduced in size, puckered, and marked by translucent chlorotic spots; Plants: Show no growth; also, show various degree of dieback (Smith)
	Gymnosporangium asiaticum Miyabe ex Yamada (rust)	After leaves are fully opened	**Leaves**: Upper surface: orange-yellow spots; lower surface: brown spots with yellowish-red margins; telia occur on juniperus needles
	Apple Ring Spot Agent	When fruits are about 3 cm in diameter until harvest	**Occurs only on fruits:** Starts as small, brown areas. Develops into irregular patches of varying shades of brown (to reddish brown) with rough, russeted surface (sometimes intersected by little cracks) and scaly margin. As fruit ripens, a brown halo, or a series of concentric rings, forms around lesions. The skin around the halo (or rings) is light green or yellow even on red fruits

Table H-2 Inspection Aid for Plants Growing in Postentry Quarantine (page 7 of 18)

Host group:	Pathogen or disease:	Preferred inspection period:	Symtpoms:
Datura spp. (thornapple)	Datura Colombian Virus	Spring and early summer	**Leaves**: 1) Veinbanding or chlorotic flecking followed by mottling; 2) may become rugose and slightly distorted
	Datura Distortion or Enation Mosaic Virus	Spring and early summer	**Leaves**:1) First symptoms—pronounced vein clearing, curling or margins and upward folding of youngest leaf near its base followed by discoloration; 2) symptoms become more prominent and color gradually turns lighter green with few dark-green spots; 3) subsequent leaves show pronounced margin curling and almost double folding upwards; 4) severe malformation (distortion)—reduction of laminae to midrib **only** resulting in a shoestring (tendril-like) effect **Flowers and buds**: Severe distortion and malformation, whorls imperfectly developed and corolla and calyx rupturing
Dendranthema spp. (*see* Chrysanthemum spp. on page H-4)			
Dianthus spp. (pink)	Carnation Etched Ring Virus	Spring and early summer	**Leaves**: Oval- to dumbbell-shaped whitish necrotic flecks and rings with dark brown–maroon edges
	Carnation Necrotic Fleck Virus	Spring and early summer	**Leaves**: Grayish white or reddish-purple flecks
	Carnation Streak Agent	Spring and early summer	**Leaves**: Yellowish or reddish spots parallel to veins. Lower surface may be heavily spotted and turn yellow
	Phialophora cinerescens (Wr.) van Beyma (=*Verticillium cinerescens* Wr.)	Any time	**Leaves**: Wilted, wrinkled, and chlorotic; vascular ring discoloration **Stems**: May have "kinks" at nodes and internodes shortened

Table H-2 Inspection Aid for Plants Growing in Postentry Quarantine (page 8 of 18)

Host group:	Pathogen or disease:	Preferred inspection period:	Symtpoms:
Eucalyptus spp. (Australian gum)	Leaf Chlorosis Agent	After leaves are fully opened until 6 weeks later	**Leaves**: Chlorosis and size reduction **Plants**: Die in full sunlight; less chlorotic plants may live for some years, but growth is retarded
	Pestalotia disseminata Thuem. (Parasitic Leaf Fungus)	From full leaf maturity and thereafter	**Leaves**: Premature drop; blight
Euonymus spp. (spindle tree)	*Euonymus* Mosaic Agent	After leaves are fully opened until 6 weeks later	**Leaves**: Wide yellow border and center are mottled green or greenish-yellow; young leaves show yellow veination
Fraxinus spp. (ash)	*Pseudomonas savastanoi* var. *fraxini* (Brown) Dowson (Canker and Dwarfing Disease)	All season	**Young trees**: Dwarfed **Branches and trunk**: Cankers and discoloration of tissue beneath bark
Gladiolus spp. (corn flag, sword lily)	*Puccinia mccleanii* Doidge (rust)	When leaves are out	
	Uredo gladioli-buettneri Bub. (rust)	When leaves are out	
	Uromyces gladioli P. Henn. (rust)	When leaves are out	**Leaves**: Small, brown-black pustules crowded together to form a crust
	Uromyces transversalis (Thuem.) Wint. (rust)	When leaves are out	**Leaves**: Powdery, bright orange pustules on both surfaces in linear series perpendicular to veination

Table H-2 Inspection Aid for Plants Growing in Postentry Quarantine (page 9 of 18)

Host group:	Pathogen or disease:	Preferred inspection period:	Symtpoms:
Hibiscus (*see* Abelmoschus spp. (okra) on page H-1)	Cotton Leaf-Curl Agent	After leaves are fully opened until 6 weeks after	**Leaves**: Conspicuous net-veinenations; on severely affected plant, leaves are small, thick, and curled downwards; also, on severely affected plants, may have "bunchy-top" appearance
	Hibiscus Yellow Vein Mosaic Agent	When leaves are developing until leaves are fully opened	**Leaves**: Vein chlorosis; chlorotic areas yellowish green around leaf tissues to bright yellow near veins. Lower leaf surfaces: veins swollen (thickened), brittle and dark green; vein thickening causes leaf to curl downwards
	Okra Mosaic Virus	Spring and early summer	**Youngest leaves**: 7 to 8 days after inoculation: light-green mosaic or regular chlorosis of veins **Next two to three leaves produced**: one or more principal veins bordered by broad chlorotic bands **Later leaves**: no symptoms
Humulus spp. (hop)	Hop Nettlehead Strain of Arabis Mosaic Virus	After leaves are fully opened until 6 weeks after	**Plant**: Poor growth and degeneration of plant; reduction of both number and weight of cones
Hydrangea spp.	*Puccinia glyceriae* S. Ito (*Aecidium hydrangea*)	When leaves are out	**Leaves**: Orange-yellow lesions on the upper surface (spermogonia); aecia on the lower surface of the leaf are cup shaped and pale yellow in color
Jasminum spp. (jasmine)	Jasmine Variegation Agent	After leaves are fully opened until 6 weeks later	Leaves and young branches: Yellowish variegation
Juniperus spp. (juniper)	*Stigmina deflectans* (Karst) Ellis (Needlecast Disease)	When needles are turning brown	**Needles**: Minute brownish fruiting bodies along the median veins of the upper side of needles
	Phacidiopycnis pseudotsuga (M. Wils..) Hahn (Douglas Fir Canker)	Throughout growing season	**Branches and trunk**: cankers; often exude abundance of resin; fungus not perennial, therefore, isolated cankers may heal over

Table H-2 Inspection Aid for Plants Growing in Postentry Quarantine (page 10 of 18)

Host group:	Pathogen or disease:	Preferred inspection period:	Symtpoms:
Larix spp. (larch)	*Phacidiopycnis pseudotsuga* (M. Wils.) Hahn (Douglas Fir Canker)	Throughout growing season	**Branches and trunk**: cankers; often exude abundance of resin; fungus not perennial, therefore, isolated cankers may heal over
	Lachnellula wilkommii (Hartig) Dennis (European Larch Canker)	Throughout growing season	**Branches and trunk**: cankers causing girdling dieback
Leucanthemella serotina	*Puccinia horiana* P. Henn. (White Rust of Chrysanthemum)	When leaves are fully out; spring: 3 to 6 weeks after planting and again later in the season; summer	**Leaves**: Upper surface—greenish-yellow spots. Lower surface—raised, waxy, whitish-yellow to pink pustules **Young shoots**: Wilt and die
Ligustrum spp. (privet)	Ligustrum Mosaic Agent	After leaves are fully opened until 6 weeks after	**Leaves**: Clear yellow spots
Litchi chinensis (fruit and nut List)	Inspect for any potential exotic pathogen	Various times of year	*See* Plant Genera Subject to Postentry Quarantine on page E-1
Mahoberberis (Berberis x *Mahonia* hybrid)	*Puccinia graminis* Pers. (Black Stem Rust)	Between 5 to 9 weeks after leaves are fully opened	**Leaves**: Rust appears first on upper surface as yellowish round spots with brighter yellow or reddish-purple margins; later, discolored, slightly thickened spots appear on lower surface (this stage also appears on stem and fruit)
Mahonia spp. (Oregon grape, holly grape)	*Puccinia graminis* Pers. (Black Stem Rust)	Between 5 to 9 weeks after leaves are fully opened	**Leaves**: Rust appears first on upper surface as yellowish round spots with brighter yellow or reddish-purple margins; later, discolored, slightly thickened spots appear on lower surface (this stage also appears on stem and fruit)

Table H-2 Inspection Aid for Plants Growing in Postentry Quarantine (page 11 of 18)

Host group:	Pathogen or disease:	Preferred inspection period:	Symtpoms:
Malus spp. (apple)	Apple Proliferation Phyto-plasma	Late summer and fall— opening of blossoms on infected branches; fall— growth of axillary buds (Witches' Broom); spring—early leafing out	**Buds and leaves**: 1) first symptoms—reddening of leaves and late growth of terminal buds; 2) second symptom—Witches' Broom may appear in the same or later years; 3) infested plants may become symptomless after 2 to 3 years of acute reaction
	Diaporthe mali Bres. (leaf, branch, and fruit fungus)	Spring and early summer	**Leaves**: Pale, discolored spots; may curl and drop prematurely **Young shoots**: Irregular, brownish canker about 6 inches below tip; twig surface gradually dries and cracks causing death of shoot
	Apple Branch Canker (Valsa Canker) (*Valsa ceratosperma*; Gvritischvili)	Spring (more likely to see during a wet period)	**Bark**: Swollen, water-soaked lesions; small black pycnidia appear in the lesions later and spore horns approximately 1 month after that; cankers (usually on older plants) on the upper side of limbs; a girdling type of injury may be observed on weakened branches and twigs. These signs will probably be found **only** during the second growing season inspection
	Guignardia piricola (Nose) Yamamoto (leaf, branch, and fruit disease)	Spring and summer	**Leaves**: Brown to dark brown spots surrounded by a ring **Branches and trunk**: Round oval lesions; infected and healthy tissues separated by a crack or crevice; lesion surface depressed, brown in color with many fruiting bodies in center
	Valsa ceratosperma (Tode ex Fr.) Maire (V. mali) (Apple Branch Canker)	Throughout growing season	**Bark**: On the upper side of limbs the bark appears swollen and water soaked especially when wet. The resultant canker becomes sunken, darker, and cracked on the surface. Black pycnidia appear in the canker in late spring and spore horns about 1 month later. These signs will probably be found **only** during the second growing season inspection

Table H-2 Inspection Aid for Plants Growing in Postentry Quarantine (page 12 of 18)

Host group:	Pathogen or disease:	Preferred inspection period:	Symtpoms:
Morus spp. (mulberry)	Mulberry Dwarf Phytoplasma	Late spring to early summer	**Leaves**: Normal leaves are produced at the beginning if winter temperatures were below 20°C; check leaves produced later after causal agent had moved from the roots and multiplied in newly growing shoots; chlorosis of leaves **Branches**: Proliferation (Witches' Broom)
	Mulberry Curly Little Leaf Agent	Spring to early summer	**Leaves**: Deformed; retards growth in general and development of root system
	Mulberry Mosaic Agent	Up to 6 weeks after leaves are fully opened	**Leaves**: Typical mosaic mottling, occasionally accompanied by slight curling and puckering; no noticeable reduction in leaf size
	Aecidium mori (Barclay) Dietel (Mulberry Rust)	Late spring to early summer for your geographical location	Aecia with spores on upper and lower surfaces of the leaf. They are solitary or in groups on leaves, buds, leaf veins, and petioles. Can be in elongated clusters up to 1 cm. long causing distortion and excessive host tissue growth
Nipponanthemum nipponicum	*Puccinia horiana* P. Henn. (White Rust of Chrysanthemum)	When leaves are fully out; spring: 3 to 6 weeks after planting and again later in the season; summer	**Leaves**: Upper surface—greenish-yellow spots. Lower surface—raised, waxy, whitish-yellow to pink pustules **Young shoots**: wilt and die

Table H-2 Inspection Aid for Plants Growing in Postentry Quarantine (page 13 of 18)

Host group:	Pathogen or disease:	Preferred inspection period:	Symtpoms:
Olea europaea (olive)	Olive Partial Paralysis Virus	After leaves are fully opened until 6 weeks later	**Leaves**: Chlorotic, curled leaves on secondary twigs or mosaic pattern with midrib darkening **Twigs**: The entire branch shrivels from the tip downward; a dark reddish-purple band appears on the bark; sections of twigs may have a strong fermentation odor
	Olive Sickle Leaf Virus	After leaves are fully opened until 6 weeks later	**Leaves**: Chlorotic, blotched, streaked, are sickle-shaped, curved, puckered or otherwise deformed; they are light green with white markings **Branches**: May be stunted and may appear **only** in individual branches; diseased plants appear bushy
Passiflora spp. (passion fruit)	Passion Fruit Woodiness Virus	During spring growth and early summer	**Leaves**: ***P. edulis***: mosaic, distortion, and crinkles, with yellow spots on older leaves ***P. edulis f. flavicarpa* and hybrids**: Pale-green to yellowish ringspots and leaf mosaic on spring growth
Philadelphus spp. (mock orange)	Elm Mottle Virus	After leaves are fully opened until 6 weeks after	**Leaves**: Chlorotic ringspot, mottling, and line pattern
Picea spp. (spruce)	*Chrysomyxa ledi* (Alb. & Schw.) d By var. *rhododendri* (DC) Savile (rhododendron—Spruce Needle Rust)	Fall	**Leaves**: Premature defoliation of heavily infected needles
	Phacidiopycnis pseudotsuga (M. Wils.) Hahn (Douglas Fir Canker)	Throughout growing season	**Branches and trunk**: girdling up to 6 inches wide **Large branches and trunk**: cankers; isolate cankers may heal over as fungus is not perennial on bark
Pinus spp. (two- or three-leaved) (pine)	*Cronartium flaccidium* (Alb. & Schw.) Wint. (rust causing serious stunting of hard pines)	Late spring to early summer	**Bark**: Irregular, ballooned, pale, yellow sacs containing powdery, orange spores
	Gall forming rust		
Populus spp. (poplar, aspen, cottonwood)	*Xanthomonas populi* Ride (canker)	Spring and early summer	**Leaves**: young leaves turn black **Shoots**: presence of canker and slime exude (especially during wet weather); slime exude also from base of dead buds and at internodes

Table H-2 Inspection Aid for Plants Growing in Postentry Quarantine (page 14 of 18)

Host group:	Pathogen or disease:	Preferred inspection period:	Symtpoms:
Prunus spp. (stone fruit)	Plum Pox (=Sharka) Virus	When leaves are fully opened, until six weeks after	**Plum**: **Leaves**: severe diffused olive-green rings or mottling **Fruit**: skin with dark colored rings; flesh with brown or red discoloration **Seed**: brown spots **Peach: Leaves**: vein yellowing, chlorotic spotting, and distortion **Flowers**: some varieties will show color breaking symptoms **Apricot:Leaves**: diffused pale-green rings and lines **Seed**: yellow rings
	Apple Proliferation Phytoplasma in *P. armeniaca* (apricot); *P. avium* (cherry); and *P. domestica* (plum)	Spring and summer	**Leaves**: wilting to leading to leaf death **Branches and trunk**: necrosis visible when cut across and longitudinally **Flowers**: become necrotic
		Starting in the spring and throughout the season	**Leaves**: wilting **Flowers**: necrosis on cherry flowers **Branches and trunks**: necrosis in cross-section
	Cherry Leaf Roll Virus	Spring and summer	**Spring**: Delayed leafing and flowering **Summer**: 1) Margins of leaf roll upwards and, in some varieties, leaf turns purple; 2) infected tree declines in vigor and gum exudes from splits in bark
	Cherry Rusty Mottle (European) Agent	Late summer	**Leaves**: Rust-colored pigmentation

Table H-2 Inspection Aid for Plants Growing in Postentry Quarantine (page 15 of 18)

Host group:	Pathogen or disease:	Preferred inspection period:	Symtpoms:
Prunus spp. (stone fruit) (continued)	European Stone Fruit Yellows Phytoplasma	Spring and summer	**Early symptoms**: leaf rolling and yellowing **Later symptoms**: shoot proliferation and unseasonal growth (during winter) Characteristic disease symptoms: presence of weak shoot with small leaves among normal shoots and irregularly distributed dried twigs on branches
	Plum Bark Split Strain of Apple Chlorotic Leaf Spot Virus	Throughout growing season	**Bark**: formation of reddish-brown areas that become sunken, hard, and usually split; splits increase and are flanked by sunken areas of dead bark with wavy margin
	Arabis Mosaic Virus and its strains	For Chlorotic symptoms, not more than 6 weeks after leaves are fully opened	**Plants**: dwarfing from slight stunting to extreme miniaturization (extreme miniaturization condition—leaves are twisted, cupped, crinkled, or deformed) **Leaves**: chlorosis between veins and in irregular blotches or yellowing of whole leaves or leaf edges
	Raspberry Ringspot Virus and its strains	Up to 6 weeks after leaf is fully opened	**Leaves**: “rasp-leaf” condition
	Tomato Blackring Virus and its strains	Spring and early summer	**Peach**: shoot stunting **Almond**: leaf enations
	Strawberry Latent Ringspot Virus and its strains	Spring and early summer	**Peach**: causes dwarfing **Cherry**: veinal chlorosis and reddening of leaves
Pseudolarix spp. (golden larch)	*Lachnellula wilkommii* (Hartig) Dennis (European Larch Canker)	Throughout growing season	**Branches and trunks**: cankers causing girding dieback
Pseudotsuga spp. (Douglas fir)	*Phacidiopycnis pseudotsuga* (M. Wils.) Hahn (Douglas Fir Canker)	Throughout growing season	**Terminal buds and shoots**: die-back **Branches or trunk**: girdling up to 6 inches wide **Larger branches or trunk**: cankers; isolated cankers may heal over as fungus is not perennial on bark

Table H-2 Inspection Aid for Plants Growing in Postentry Quarantine (page 16 of 18)

Host group:	Pathogen or disease:	Preferred inspection period:	Symtpoms:
Pyrus spp. (pear)	*Guignardia piricola* (Nose) Yamamoto (leaf, branch, and fruit disease)	Spring and summer	**Leaves**: brown to dark-brown spots surrounded by a ring **Branches or trunk**: round oval lesions, infected and healthy tissues separated by a crack or crevice; lesion surface depressed, brown in color and with many fruiting bodies in center
	Apple Proliferation Phytoplasma	First-year growth of scion wood and second-year growth of budsWitches' Broom	**Bud grafts**: reddening of leaves and late growth of terminal buds the second year of growth
	Pear Blister Canker Viroid	Spring and early summer	**Stems**: Small blisters appear in early spring. Later, splits and cracks appear and coalesce to form cankers; may kill young trees
	Pear Bud Drop Agent	Early spring	**Buds**: most fall at bud break; others start growth after 2 weeks delay; new buds develop on scars of fallen ones giving rise to thin, short shoots (rosette); causes poor graft (dead tissues between scion and rootstocks) and stem pitting
	Gymnosporangium asiaticum Miyabe ex. Yamada (rust)	After leaves are fully out	**Leaves**: upper surfaces: small, orange-yellow spots lower surfaces: brown spots with yellowish-red margins
	Valsa ceratosperma (Tode:Fr.) Mair (anamorph: *Cytospora sacculus* (Schwein.) Gvritischvili) (Valsa Canker)	Spring (more likely to see during a wet period)	**Bark**: swollen, water-soaked lesions; small black pycnidia appear in the lesions later and spore horns approximately 1 month after that; cankers (usually on older plants) on the upper side of limbs; a girdling type of injury may be observed on weakened branches and twigs
	Apple Ring Spot Agent	Before and at fruit harvest	**Mature fruit:** small, light-brown areas, varying in size and shape **Ripened fruit**: distinct, reddish spots intersected by little cracks; spots develop a broom halo or series of concentric rings

Table H-2 Inspection Aid for Plants Growing in Postentry Quarantine (page 17 of 18)

Host group:	Pathogen or disease:	Preferred inspection period:	Symtpoms:
Quercus spp. (oak)	*Stereum hiugense* Imazeki (White Rot)	Throughout growing season	**Stems and branches**: most likely a wound parasite causing decay of the wood; wood turn dark brown, some forming dark-brown streaks
Ribes spp.	Black Currant Reversion Virus	During blossom period, late spring, and early summer	**Buds**: smooth and brightly colored as compared with hairy and grey normal bud; flower may be malformed and "double" **Leaves**: flatter than normal; number reduced and chlorotic during blossom period
Rosa spp. (rose)	Rose Wilt Agent	After leaves are fully opened until 6 weeks later	**Plants**: wilted; pinched, yellowish-green shoots and eventually die-back and death; also, stems proliferation **Leaves**: epinasty; turn pale green or yellow; brittle and easily detached
Rubus spp. (bramble)	Rubus stunt phytoplasm	Early summer	**Leaves**: on infected cane, paler than normal **Canes**: small, thin, and weak; also excessive lateral branching (bushy appearance) **Flowers**: green, leaf-like petals; also excessive proliferation of flowers
Salix spp. (willow)	*Erwinia salicis* (Day) Chester (*Brenneria salicis*) (Watermark Disease)	Throughout growing season	**Leaves**: turn bright red in early summer during hot weather; remain on stem **Shoots**: show bacteria containing liquid drips; grayish discoloration inside shoot when cut
Sorbus spp. (mountain ash)	Mountain Ash Variegation Agent	After leaves are fully opened until 6 weeks later	**Leaves**: yellow or white variegation, sometimes vein-clearing and vein-banding
	Taphrina piri Kusano (Leaf Distortion Fungus)	Throughout growing season	**Leaves**: yellowish-green spots; later spots show pruinose, hairy–white growth on surface
Syringa spp. (lilac)	Elm Mottle Virus	After leaves are fully opened until 6 weeks later	**Leaves**: chlorotic ringspots and line pattern
Ulmus spp. (elm)	Elm Mottle Virus	After leaves are fully opened until 6 weeks later	**Leaves**: chlorotic ringspots and line pattern

Table H-2 Inspection Aid for Plants Growing in Postentry Quarantine (page 18 of 18)

Host group:	Pathogen or disease:	Preferred inspection period:	Symtpoms:
Watsonia spp.	*Puccinia mccleanii* Doidge (rust)	When leaves are out	
	Uredo gladioli-buettneri Bub. (rust)	When leaves are out	
	Uromyces gladioli gladioli P. Henn (rust)	When leaves are out	**Leaves**: small, brown-black pustules crowded together to form a crust
	Uromyces transversalis (Thuem.) Wint. (rust)	When leaves are out	**Leaves**: powdery, bright orange pustules on both surfaces in linear series perpendicular to veination

Appendix

I

Pesticide Safety

Precautions

Practice the following safety precautions:

1. Check container markings, labels, and accompanying documents to learn if the seed was treated. If the accompanying documents indicate that the seed was treated, skip to Step 3. If the documents tell you nothing, go to Step 2.
2. If you didn't learn anything from the labels or accompanying documents, carefully examine the container and the seed for pesticide residue. If you detect a chemical odor, suspect the seed was treated. If pesticides are suspected, recheck the documentation and labeling to learn the name of the pesticide. By knowing what the pesticide is, you can take the most appropriate action if pesticide poisoning occurs.
3. Don't breathe the air around the open container or the treated seed. Work in a well-ventilated area.
4. If it is necessary for you to touch the seed, wear latex gloves. To increase your protection, handle the seed as little as possible.
5. Once you complete your inspection, appropriately discard the latex gloves. Wash your hands with soap and water.
6. If the seed showed evidence of having been treated but was not so marked, mark the documents and container. Mark them to alert other people who may have to handle the shipment.

Glossary

Postentry Quarantine

Use this glossary to find the meaning of specialized words, abbreviations, acronyms, and terms used in regulating postentry quarantine materials. To locate where in the manual a given definition, term, or abbreviation is mentioned, refer to the index.

Definitions, Terms, and Abbreviations

advisories. important information throughout the manual brought to the user's attention

aecium. cuplike structure of some rust fungi that contains chains of aeciospores

APHIS. Animal and Plant Health Inspection Service

APHIS Form 7060. Official Warning Violation of Federal Regulations

blight. any of numerous plant diseases resulting in sudden conspicuous wilting and dying of affected parts, especially young, growing tissues

cancellate. to make in a crisscross pattern

cankers. (a) localized diseased or necrotic area on a plant part, especially on a trunk, branch, or twig of a woody plant, usually caused by fungi or bacteria; (b) any of several diseases of plants characterized by the presence of such lesions

character. astructure, function, or attribute determined by a gene or group of genes

chlorosis. yellowing or whitening of normally green plant tissue because of a decreased amount of chlorophyll, often as a result of disease or nutrient deficiency

clavate. having one end thickened; club-shaped

deliquesce. (a) to branch out into numerous subdivisions that lack a main axis, as the stem of an elm; (b) to become fluid or soft on maturing, as certain fungi

dieback. gradual dying of plant shoots, starting at the tips, as a result of various diseases or climatic conditions

erupment. bursting through or as if through a surface or covering

girdle. to remove a band of bark and cambium from the circumference of (a tree) usually in order to kill it

graft. (a) to unite (a shoot or bud) with a growing plant by insertion or by placing in close contact; (b) to join (a plant or plants) by such union

host. animal or plant on which or in which another organism lives

hyaline. resembling glass, as in translucence or transparency; glassy

lacerate. having jagged, deeply cut edges

necrosis. death of cells or tissues through injury or disease, especially in a localized area of the body

paraphysis. one of the erect sterile filaments often occurring among the reproductive organs of certain fungi, algae, and mosses

pedicel. small stalk or stalk-like part bearing a single flower in an inflorescence

pedicellate. having or supported by a pedicel

PEQ. Postentry Quarantine

PEQLO. PPQ Postentry Quarantine Liaison Officer

PEQP. Postentry Quarantine Program

PEQU. Postentry Quarantine Unit

peridium. covering of the spore-bearing organ in many fungi

PIS. Plant Inspection Station

PPQ Form 236. Notice of Shipment and Report of Inspection of Imported Plants to be Grown Under Postentry Quarantine

PPQ Form 391. Specimens for Determination

PPQ Form 518. Report of Violation

PPQ Form 546. Agreement for Postentry Quarantine—State Screening Notice (7 CFR 319.37)

PPQ Form 569. Release From Postentry Quarantine

PPQ Form 587. Application for Permit to Import Plants or Plant Products

PPQ Form 597. Import Permit for Plants and Plant Products

pruinose. having a white, powdery covering or bloom

pulvinate. having a swelling at the base. Used of a leafstalk

pyriform. shaped like a pear

roguse. having a rough, wrinkled surface, as in certain prominently veined leaves

sorus. reproductive structure in certain fungi and lichens (pl: sori).

SPHD. State Plant Health Director

SPRO. State Plant Regulatory Official

striate. marked with atriae; striped, grooved, or ridged

telium. pustule-like sorus formed on the tissue of a plant infected by a rust fungus and producing teliospores

USDA. United States Department of Agriculture

vector. an organism that carries disease-causing microorganisms from one host to another

verrucose. covered with warts or wart-like projections

xylem. supporting and water-conducting tissue of vascular plants, consisting primarily of tracheids and vessels; woody tissue

zonate. Having zones; belted, striped, or ringed

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