

Syllabus
HORT 120. **General Viticulture** -- 3 Credits
Term, Year
Meeting Day(s), Time, Place

Instructor: *Name and Title*
Office: *Location and office hours (if applicable)*
Phone: *Include personal number only if you are willing to release to students*
E-mail: *@tillamookbay.cc or @mail.tillamookbay.cc or other*

Course Description: Introduces grape growing. Covers botany, fruiting and rootstock cultivars; anatomy and physiology; history and distribution of grapes; vine classification; world growing areas, including latitude, climate and soils; and common diseases and pests.

Addendum to Course Description

Suggested Required Text: **Grapes**, G.L. Creasy and L.L. Greasy, 2009, CABI, Oxfordshire, UK.

Additional Suggested Texts:

Oregon Viticulture, Oregon Winegrowers Association, 1st Ed. Editor, Hellman, Edward 2003.

General Viticulture, Winkler, A.J., Cook, J.A., Kliewer, W.M., and Lider, L.A., University of California Press, 1974 edition.

Sunlight into Wine, Smart, Richard and Robinson, Mike, Winetitles, Adelaide, Australia, 1991.

TBCC Email: TBCC will use electronic communication methods to conduct official and legal College business. Students are responsible to check their TBCC email and the TBCC student portal (MyTBCC) for information from the College.

Course Learning Outcomes:

1. Relate the importance of grapes and wine to world history.
2. Compare and contrast world grape growing regions, and their latitude, climate and soils.
3. Identify and define vine anatomy and physiology, cultivation practices and vine diseases.
4. Explain the relationship between grape quality and wine quality.
5. Describe the relationship between soil and climate to grape quality.
6. Identify and define the relationship of botany to vine classification, fruiting and rootstock cultivars.

Program Learning Outcomes:

- Perform critical reasoning, perceive assumptions, and make judgments based on the basic principles of agriculture, natural resources, and related fields.
- Exhibit critical thinking skills when addressing issues in agriculture, natural resources, and related fields.

Institutional Learning Outcomes:

- ILO #8 Analyze and evaluate information to address issues and solve problems.
- ILO #13 Demonstrate the knowledge, skills, and professional attitude necessary to enter and succeed in a defined profession or advanced academic program.

Competencies and Skills:

- I. History
 - A. *Vitis vinifera* Origins
 - B. *Vitis* Grapes in the New World
 - C. Impact of Wine on History, Religion and Economy
 - D. Impact of Grapes and Wines on European History
 - 1. Roman Influence on Grape Growing
 - 2. Phylloxera's Economic Disaster
- II. Classification of Grapes
 - A. Species
 - 1. Species for Fruiting Cultivars
 - 2. Species for Rootstock Cultivars
 - B. Cultivars for Wine and Fruit Production
 - 1. Cultivars Adapted to Cool Climates
 - 2. Cultivars Grown in Oregon
- III. The Anatomy and Physiology of the Grape Vine
 - A. Transpiration
 - B. Transport Systems
 - 1. Xylem
 - 2. Phloem
 - C. Photosynthesis
 - D. Respiration
 - E. Translocation
 - F. Annual Vine Cycles
- IV. Vine Influences
 - A. Climate
 - B. Site
 - C. Water
 - D. Soil Nutrients
- V. Vine and Grape Descriptors
 - A. Terminology
 - B. Morphology
- VI. Overview of Grape Diseases, Disorders and Pests
 - A. Insect and animal pests
 - B. Weed Competition
 - C. Fungal and Other Diseases
 - 1. Powdery Mildew
 - 2. Botrytis Bunch Rot
 - 3. Crown Gall
 - 4. Fan Leaf Virus
 - D. Other Injuries to the Vine

Instructional Materials:

Required Text: G.L. Creasy and L.L. Greasy, Grapes. CABI, Oxfordshire, UK. 2009.

Course Requirements:

Quizzes: Quizzes will be worth 100 points each. There will be 10 quizzes over the course of the term that will occur at the start of class and cover material from the previous week(s). There will not be a quiz in the first week of the term. Altogether, Quizzes will count as 30% of the final grade in the course.

Mid-Term Exam: The Mid-Term Exam will count as 30% of the final course grade. The Mid-term will cover material from Weeks 1-4 and include multiple choice and short-answer questions.

Final Exam: The Final Exam will count as 40% of the final course grade. The Final will be given during Final's Week and will be comprehensive. It will include multiple choice and short-answer questions.

Grading:

Quizzes = 100 points each = 1,000 points	30% of final course grade
Mid-Term Exam = 100 points	30% of final course grade
Final Exam = 100 points	40% of final course grade

A = 90-100% B = 80-89% C = 70-79% D = 60-69% F = 0-59%

ADA Statement:

Students who have a documented disability and require a classroom adjustment or accommodation should contact the Disabilities Coordinator/Career Education Advisor and provide the Approved Academic Accommodation form to the Instructor.

Academic Support Statement:

The Learning Center provides assistance to students with writing and math assignments. Hours are posted in the Library and classrooms. Peer tutors are available to assist students in a variety of subjects. Contact the Library for more information on peer tutoring.

Class Registration Statement:

Students may attend this course only if registered. Students who are unable to attend must drop the course through Student Services. To have tuition charges removed, the course must be dropped by the student before the drop with refund deadline in the Class Schedule. Students who never attend, or stop attending, without dropping may receive a NS, W, or F and will be required to pay for the course.

Grading Options Statement:

Students taking credit classes can choose between receiving traditional letter grades (A-F) and Pass/No Pass (P/NP) if the department has permitted both options for a course. *If you do not select a grading option*, you will automatically have the default grading option for that course. The default option is generally a letter grade, but could be pass/no pass. You can change your grading option through Student Services up until the eighth week of the term (for an eleven-week course). The only grading option available for each student is the one the student submitted during the selection timeframe. With the instructor's written permission, some courses may allow students to attend a course without receiving a grade or credit for the course. In order to Audit a class, you must return a signed form to Student Services. Your request must be processed by Student Services by the drop deadline for the course. You cannot opt into or out of (i.e. change your grading option from audit to a letter grade) after the drop deadline. Auditing a course does not satisfy requirements for entry into courses where prerequisites are specified.

Academic Integrity/Student Conduct Statement:

Students of Tillamook Bay Community College are expected to behave as responsible members of the College community while on campus and to be honest, ethical, and professional in their behavior and academic work. Tillamook Bay Community College strives to provide students with the knowledge, skills, judgment, and wisdom they need to function in society and careers as educated adults. Respect for others and behavior appropriate for a professional and educational environment is required of all. Behavior that violates the Code of Student Conduct, including any behavior disruptive to the educational

process, is subject to disciplinary action. To falsify or fabricate the results of one's research; to present the words, ideas, data, or work of another as one's own; or to cheat on an examination is dishonest and corrupts the essential process of higher education. Academic dishonesty is also subject to disciplinary action. The full text of TBCC's Code of Student Conduct and Academic Integrity Policy can be found in the Student Rights and Responsibilities section of the TBCC Catalog.

Tentative Schedule by Week/Day and Date:

Week 1.	Introduction History of Grapes and Wine
Week 2.	Classification of Grapes: Species Classification of Grapes: Cultivars for Wine and Fruit Production
Week 3.	The Anatomy and Physiology of the Grape Vine, Part I
Week 4.	The Anatomy and Physiology of the Grape Vine, Part II
Week 5.	Review for Mid-Term Mid-Term Exam
Week 6.	Vine Influences, Part I
Week 7.	Vine Influences, Part II
Week 8.	Vine and Grape Descriptors
Week 9.	Grape Diseases, Disorders and Pests, Part I
Week 10.	Grape Diseases, Disorders and Pests, Part II Review for Final Exam
Week 11.	Final Exam

Technology Statement: (This is required for online and hybrid courses, but suggested for others.)

Most students need the following in order to take courses at TBCC. You are still encouraged to take this class, but if you lack technical or skill knowledge, please see me after class or make an appointment so that we can talk.

Technical (need):

1. Access to a computer (at home, school, or work) which you can use for extended periods of time.
2. Broadband internet access (cable modem, DSL, or other high speed).
3. Firefox 3.0 or later or Internet Explorer 7 or later. Safari and Chrome also work.
4. Permission/ability to install plug-ins or class software (e.g. Adobe Reader or Flash).
5. Highly recommended: up-to-date anti-virus software. If you are using your own computer check out the free anti-virus program at www.Avast.com.

Skills (ability):

1. Navigate web sites, including downloading and reading files from web sites.
2. Download and install software or plug-ins such as Adobe Reader or Flash.
3. Use email, including attaching and downloading documents/files from emails.

4. Save files in commonly used word processing formats (.doc, .docx, .rtf).
5. Copy and paste text and other items on a computer.
6. Save and retrieve documents and files on your computer.
7. Locate information on the internet using search engines.



Course Content and Outcomes Guide

DATE: 2/14/2014
SUBMITTED BY: Jeff Sherman/Emily Henry/Lori Gates
COURSE NUMBER: **HORT 120**
COURSE TITLE: **General Viticulture**
CREDIT HOURS: **3**

LECTURE HOURS: 30
LECTURE/LAB HOURS:
LAB HOURS:

SPECIAL FEE:

COURSE DESCRIPTION and PREREQUISITES:

Introduces grape growing. Covers botany, fruiting and rootstock cultivars; anatomy and physiology; history and distribution of grapes; vine classification; world growing areas, including latitude, climate and soils; and common diseases and pests.

ADDENDUM TO COURSE DESCRIPTION:

Suggested Required Text: **Grapes**, G.L. Creasy and L.L. Greasy, 2009, CABI, Oxfordshire, UK.

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Sunlight into Wine, Smart, Richard and Robinson, Mike, Winetitles, Adelaide, Australia, 1991.

INTENDED COURSE OUTCOMES:

1. Relate the importance of grapes and wine to world history.
2. Compare and contrast world grape growing regions, and their latitude, climate and soils.
3. Identify and define vine anatomy and physiology, cultivation practices and vine diseases.
4. Explain the relationship between grape quality and wine quality.
5. Describe the relationship between soil and climate to grape quality.
6. Identify and define the relationship of botany to vine classification, fruiting and rootstock cultivars.



OUTCOME ASSESSMENT STRATEGIES:

Student learning outcomes will be evaluated through a variety of means, including (but not limited to) some or all of the following:

- Quizzes
- Attendance/participation
- Written assignments
- Presentations

COURSE CONTENT (Themes, Concepts, Issues) and SKILLS:

- I. History
 - A. *Vitis vinifera* Origins
 - B. *Vitis* Grapes in the New World
 - C. Impact of Wine on History, Religion and Economy
 - D. Impact of Grapes and Wines on European History
 1. Roman Influence on Grape Growing
 2. Phylloxera's Economic Disaster
- II. Classification of Grapes
 - A. Species
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 - B. Cultivars for Wine and Fruit Production
 1. Cultivars Adapted to Cool Climates
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- III. The Anatomy and Physiology of the Grape Vine
 - A. Transpiration
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 - D. Respiration
 - E. Translocation
 - F. Annual Vine Cycles
- IV. Vine Influences
 - A. Climate
 - B. Site
 - C. Water
 - D. Soil Nutrients
- V. Vine and Grape Descriptors
 - A. Terminology
 - B. Morphology

- VI. Overview of Grape Diseases, Disorders and Pests
- A. Insect and animal pests
 - B. Weed Competition
 - C. Fungal and Other Diseases
 - 1. Powdery Mildew
 - 2. Botrytis Bunch Rot
 - 3. Crown Gall
 - 4. Fan Leaf Virus
 - D. Other Injuries to the Vine

OUTCOMES CROSSWALKS	
Identify which course outcome aligns to individual program learning outcomes. It is possible that all program outcomes may not be address by the course outcomes.	
Course Outcomes	Program Outcomes
<i>Students who complete this course should be able to:</i>	
<ol style="list-style-type: none"> 1. Relate the importance of grapes and wine to world history. 2. Compare and contrast world grape growing regions, and their latitude, climate and soils. 3. Identify and define vine anatomy and physiology, cultivation practices and vine diseases. 4. Explain the relationship between grape quality and wine quality. 5. Describe the relationship between soil and climate to grape quality. 6. Identify and define the relationship of botany to vine classification, fruiting and rootstock cultivars. 	<ul style="list-style-type: none"> • Perform critical reasoning, perceive assumptions, and make judgments based on the basic principles of agriculture, natural resources, and related fields. • Exhibit critical thinking skills when addressing issues in agriculture, natural resources, and related fields.
Identify which course outcome aligns to individual institutional learning outcomes (ILOs). It is possible that all ILOs may not be address by the course outcomes.	
Course Outcomes	ILOs
<i>Students who complete this course should be able to:</i>	
<ol style="list-style-type: none"> 1. Relate the importance of grapes and wine to world history. 2. Compare and contrast world grape growing regions, and their latitude, climate and soils. 	<p>ILO #8 Analyze and evaluate information to address issues and solve problems.</p>

3. Identify and define vine anatomy and physiology, cultivation practices and vine diseases.	ILO #13 Demonstrate the knowledge, skills, and professional attitude necessary to enter and succeed in a defined profession or advanced academic program.
4. Explain the relationship between grape quality and wine quality.	
5. Describe the relationship between soil and climate to grape quality.	
6. Identify and define the relationship of botany to vine classification, fruiting and rootstock cultivars.	

Lesson Plan: Fungal and Other Diseases

Objectives:

- Know the common diseases affecting grapes
- Understand the most frequently used prevention measures and treatments for each disease
- Identify common diseases by sight

Readings:

- Botrytis Bunch Rot: <http://www.ipm.ucdavis.edu/PMG/r302100111.html>
- Crown Gall: <http://apps.rhs.org.uk/advicesearch/profile.aspx?PID=141>
- Fan Leaf Virus: http://iv.ucdavis.edu/Viticultural_Information/?uid=3&ds=351
- Powdery Mildew: <http://apps.rhs.org.uk/advicesearch/profile.aspx?pid=253>

Activities:

- Students will look through affect vine samples to learn to identify common diseases by sight



How to Manage Pests

UC Pest Management Guidelines

| [All grape pests](#) | [All crops](#) | [About guidelines](#) |

Grape

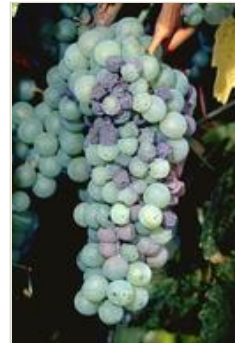
Botrytis Bunch Rot

Pathogen: *Botrytis cinerea*

(Reviewed 6/06, updated 2/14)

In this Guideline:

- [Symptoms](#)
- [Comments on the disease](#)
- [Management](#)
- [Important links](#)
- [Publication](#)
- [Glossary](#)



SYMPTOMS

Early-season [shoot blight](#) may occur following frequent spring rains. [Flowers](#) can become infected during bloom; generally the fungus then becomes dormant until late in the season when sugar concentration increases in the infected berry. The fungus then resumes growth and spreads throughout the berry. [Infected berries](#) split and leak, thus allowing the pathogen to grow and [sporulate on berry surfaces](#) and spread to adjoining berries by mid-season. Spores from infected fruit can directly infect intact, ripe berries as harvest approaches.

COMMENTS ON THE DISEASE

The fungus [overwinters](#) as sclerotia in berry mummies on the ground or left hanging on the vine and in canes. Germination and [spore production](#) occur in spring. [Infections require](#) free water for a definite period of time depending on temperature. Infections may occur during bloom should rains occur; preclose rachis infections often occur on Chardonnay. Late-season infections are most severe when relative humidity exceeds 92%, free moisture is present on the fruit surface, and temperatures are in the 58° to 82°F range. Berries that have been damaged by insects, birds, machinery, etc. may become infected at any time after the fruit begins to ripen because the juice in the berry can provide the necessary water and nutrients for fungal growth.

MANAGEMENT

Successful management of Botrytis bunch rot can be achieved through the use of several strategies. The efficacy of a fungicide depends on getting good coverage, and coverage is affected by the canopy and stage of growth. By employing cultural control methods, properly applying fungicides, and using resistant varieties, the disease can be managed.

Cultural Control

Excellent control has been achieved using canopy management and leaf removal in particular. Removal of basal leaves or basal lateral shoots at or immediately after berry set has resulted in significantly reduced incidence and severity of disease. In warmer growing areas, be careful not to remove excessive numbers of leaves, which can lead to sunburned fruit. This condition is made worse when leaves are removed later in the season. If leaves are removed at cluster set, the berries acclimate readily to the sunlight and develop a thick cuticle that helps prevent sunburn as well as Botrytis infection.

On cordon-trained vines, only remove leaves from the side of the vine that receives morning sun. Do not remove lateral shoots. If leaves are not removed and weather is dry in spring, one fungicide application should be made sometime between bloom and pea-size berries. Otherwise, apply sprays before rainfall especially at bloom or after veraison.

Northern and coastal production areas

Remove leaves or lateral shoots around clusters beginning at late bloom and continue to berry set.

Central Valley

Remove leaves (from bloom to berry set) or hedge (mid-season) to open canopy.

Organically Acceptable Methods

Canopy management and other cultural control methods along with sprays of Organic JMS Stylet Oil and Serenade are organically acceptable methods.

Monitoring and Treatment Decisions

[Look for flagging shoot tips or entire shoots](#) during rapid shoot growth. If you see flagging, attempt to break or cut the shoot in the region between the flaccid area and the adjacent area with normal turgor. Brown discoloration on the cut surface is evidence of *Botrytis*.

If the entire shoot is involved, look for a hole at the base, which could indicate feeding by branch and twig borer.

If basal leaves are not removed, apply fungicides before rain in northern and coastal production areas to prevent flower infections. Research data shows a trend toward better control if fungicides are applied at bloom, preclose, and veraison. If leaf removal is practiced, then sprays can be limited to one application if wet weather occurs during bloom (or none if no rain occurs). Thorough coverage is essential for all fungicide treatments.

A fungicide application may also be warranted if a major rain is expected late in the season when grapes are nearly mature. Otherwise, management of *Botrytis* bunch rot following bloom generally relies on proper cultural practices as outlined in [SUMMER BUNCH ROT](#).

[At harvest, check table grape for Botrytis symptoms](#) to assess this year's management program and to plan for next year.

Common name (example trade name)	Amount per acre**	R.E.I.‡ (hours)	P.H.I.‡ (days)
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The following materials are listed in order of usefulness in an IPM Program, taking into account [efficacy](#). Also consider the [general properties of the fungicide](#) as well as information relating to [environmental impact](#).

Note: *Treatments can be made in conjunction with plant growth regulators and other applications.*

- | | | | |
|---|-------------|----|----|
| A. CYPRODINIL
(Vanguard WG) | 10 oz | 12 | 7 |
| MODE-OF-ACTION GROUP NAME (NUMBER ¹): Anilinopyrimidine (9) | | | |
| COMMENTS: Do not apply more than 20 oz/acre per season. Rate is 5 to 10 oz if tank-mixed with another fungicide. | | | |
| B. FENHEXAMID
(Elevate 50WDG) | 1 lb | 12 | 0 |
| MODE-OF-ACTION GROUP NAME (NUMBER ¹): Hydroxylanilide (17) | | | |
| COMMENTS: Do not make more than two consecutive applications. Do not apply more than 3 lb a.i. product/acre per season. | | | |
| C. PYRIMETHANIL
(Scala SC) | 18 fl oz | 12 | 7 |
| MODE-OF-ACTION GROUP NAME (NUMBER ¹): Anilinopyrimidine (9) | | | |
| COMMENTS: Do not apply more than 36 fl oz/acre per season. Rate is 9 fl oz if tank-mixed with another fungicide. | | | |
| D. FLUOPYRAM + TEBUCONAZOLE
(Luna Experience) | 8–8.6 fl oz | 12 | 14 |
| MODE-OF-ACTION GROUP NAME (NUMBER ¹): Succinate dehydrogenase inhibitor (7) and Demethylation inhibitor (3) | | | |

COMMENTS: For use on wine grapes only. Do not make more than two consecutive applications; rotate to a fungicide with a different mode of action. The R.E.I. is 5 days for treated grapes when conducting cane tying, turning, or girdling of wine grapes. Do not apply more than 34 fl oz/acre per season.

- E. CYPRODINIL + FLUDIOXONIL
(Switch 62.5WG) 11–14 oz 12 7
MODE-OF-ACTION GROUP NAME (NUMBER¹): Anilinopyrimidine (9) and Phenylpyrrole (12)
COMMENTS: Do not apply in less than 21-day intervals. Do not make more than two consecutive applications; rotate to a fungicide with a different mode of action.
- F. DIFENOCONAZOLE + CYPRODINIL
(Inspire Super) 20 fl oz 12 14
MODE-OF-ACTION GROUP NAME (NUMBER¹): Demethylation inhibitor (3) and Anilinopyrimidine (9)
COMMENTS: Do not apply more than 2 consecutive applications; rotate to a fungicide with a different mode of action.
- G. IPRODIONE
(Rovral 4F) 1.5–2 lb 48 7
MODE-OF-ACTION GROUP NAME (NUMBER¹): Dicarboximide (2)
COMMENTS: Do not apply more than 4 times per season. Addition of a narrow range oil (superior, supreme) at 1% increases the effectiveness of this fungicide.
- H. PYRACLOSTROBIN + BOSCALID
(Pristine) 23 oz 12 14
MODE-OF-ACTION GROUP NAME (NUMBER¹): Quinone outside inhibitor (11) and Carboxamide (7)
COMMENTS: Do not apply on Concord, Worden, Fredonia, Niagara, and related varieties. Do not make more than 2 consecutive applications; rotate to a fungicide with a different mode of action. The R.E.I. is 5 days when conducting cane tying, turning, or girdling.
- I. NARROW RANGE OIL#
(JMS Stylet) 1% 4 0
MODE-OF-ACTION GROUP NAME (NUMBER¹): A contact fungicide with smothering and barrier effects.
COMMENTS: Foliage burn may occur if oil is applied within 2 weeks of sulfur or captan sprays. Oil will temporarily remove the 'bloom' on the berries; to avoid this, do not spray within 2 weeks of harvest.
- J. BACILLUS SUBTILIS#
(Serenade Max) 1–3 lb 4 0
MODE-OF-ACTION GROUP NAME (NUMBER¹): Microbial (44)
- ** Apply with enough water to provide complete coverage.
- ‡ Restricted entry interval (R.E.I.) is the number of hours (unless otherwise noted) from treatment until the treated area can be safely entered without protective clothing. Preharvest interval (P.H.I.) is the number of days from treatment to harvest. In some cases the R.E.I. exceeds the P.H.I. The longer of two intervals is the minimum time that must elapse before harvest.
- # Acceptable for use on organically grown produce.
- 1 Group numbers are assigned by the Fungicide Resistance Action Committee (FRAC) according to different modes of actions. Fungicides with a different Group number are suitable to alternate in a resistance management program. For more information, see <http://www.frac.info/>.

IMPORTANT LINKS

- [Photos of flagging symptoms](#)
- [Photos of fruit damage at harvest](#)

Precautions

PUBLICATION



UC IPM Pest Management Guidelines: Grape
UC ANR Publication 3448

Diseases

W. D. Gubler, Plant Pathology, UC Davis

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L. G. Varela, UC IPM Program, Sonoma County

S. Vasquez, UC Cooperative Extension, Fresno County

J. J. Stapleton, UC IPM Program, Kearney Agricultural Research Center, Parlier

A. H. Purcell, Environmental Science, Policy and Management, UC Berkeley

Acknowledgment for contributions to Diseases:

G. M. Leavitt, UC Cooperative Extension, Madera County

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[Acknowledgements](#) | [Staff-only pages](#) | [Subscribe \(RSS\)](#) | [Contact UC IPM](#)

Agriculture and Natural Resources, University of California

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Crown gall

last updated Sep 4, 2013



Crown gall is a bacterial disease of the stems and roots of many woody and herbaceous plants, including fruit, vegetables and ornamental plants. Infection with this disease causes knobby swellings (galls) on stems, roots, trunks and branches.

What is crown gall?

Crown gall is a disease caused by the bacterium *Agrobacterium tumefaciens*, which enters the plant through wounds in roots or stems and stimulates the plant tissues to grow in a disorganised way, producing swollen galls. Galls are present all year.

Crown gall affects many plants, both woody and herbaceous. These are some of the plants on which it is most commonly found:

- **Fruit:** Apples, cherries, currants, gooseberries, grapevines, blackberries, peaches, pears, plums and quince
- **Vegetables:** Beetroot, courgettes, runner beans and swedes
- **Herbaceous plants:** *Alcea* (hollyhock), *Argyranthemum* (marguerites), *Begonia*, *Dahlia*, *Lathyrus* (sweet peas), *Lupinus* (lupins) and *Phlox*
- **Woody plants:** *Crataegus* (hawthorn), *Euonymus*, *Populus* (poplar), *Salix* (willow), *Rosa* and *Ulmus* (elm)

Note: swellings caused by crown gall should not be confused with the harmless nitrogen-fixing nodules produced on the roots of many members of the pea family.

Symptoms

Quick facts

Common name

Crown gall

Scientific name

Agrobacterium tumefaciens

Plants affected

Many plants

Main symptoms

Knobby swollen galls on stems, roots, trunks and branches

Caused by

Bacterium

You may see the following:

- Swellings (galls) on the plant stems or roots. In severe cases almost all the root system may be replaced by massive, swollen tissues
- Galls on herbaceous plants decay and soon disintegrate, but those on woody plants may be hard and perennial
- Plant growth may be affected, but often there is little apparent damage and root galls may go unnoticed for long periods

Control

Non-chemical control

If crown gall is detected, lift and destroy affected plants. Grow crops of [potatoes](#) or other vegetables (except beetroot, which are also susceptible) over the next one or two years to help eliminate the bacteria from the soil, or grass the area over for one or more years.

Chemical control

There are no chemicals available for the control of crown gall.

Biology

The crown gall pathogen *Agrobacterium tumefaciens* inhabits the soil where it can survive for long periods. Not all strains of this fungus are pathogenic (capable of causing disease) and there are several different pathogenic strains with differing host ranges.

The bacteria enter stems or roots through wounds. The bacterial DNA combines with the DNA of the plant host cell where it 'transforms' the cell, causing it to become tumour-forming (galls) and also to produce specific new materials on which the bacteria feed. As the gall grows, the plant tissues become disorganised and normal transport processes are disrupted.

In herbaceous plants, the gall rots and the bacterial cells return to the soil. On woody plants, the galls are woody and perennial and do not rot away.



Viticultural Information

Subject Fanleaf Degenerative Disease

Description



Fanleaf Degenerative Disease symptoms

The terms grapevine fanleaf degeneration, infectious degeneration, and fanleaf are all used to describe the disease caused by Grapevine fanleaf virus (GFLV). Grapevine fanleaf degeneration disease is a major viticultural problem in California, causing serious reductions in yields due to poor berry set. Many of the state's most important viticultural regions were contaminated with the virus and its nematode vector in the early days of the grape growing industry. This disease occurs in most countries around the world where grapes are grown. Grapevine fanleaf disease can cause symptoms of the leaves, symptoms of the canes and shoots, and symptoms (and losses) of the fruit. Three types of leaf symptoms are common: (1) Fanleaf deformation – Leaves are asymmetric with an open petiolar sinus. The main veins are drawn close together and teeth along the margin of the leaf blade are elongated; (2) Yellow mosaic – Leaf blades develop a bright yellow color involving the entire leaf or in irregular patches across the leaf blade; and (3) Vein banding – Bright yellow bands may develop along the major veins, starting in early or midsummer. This is the most common symptom seen in California. Affected vines may be smaller than healthy ones, particularly if the nematode vector is present. The canes and foliage appear clustered because of stunting. Internodes may be irregularly spaced on canes. Canes may develop secondary shoots (breaking of bud dormancy) or split. Sometimes, canes become fasciated and tendrils occasionally develop into lateral shoots.

Fanleaf virus can greatly reduce fruit set (up to 80% in some varieties, under some conditions). Affected clusters will contain both large and small berries. The small berries are called 'shot berries' and are seedless. Severe economic losses may result from reduced fruit production.

Fanleaf disease is easily spread into new sites via diseased planting stocks. Secondary spread is dependent upon presences

of the nematode species *Xiphenima index*, the only natural vector of GFLV. This nematode acquires a charge of GFLV while feeding on diseased grape roots and later passes it into healthy grape roots.

See also *Virus Diseases*.

People	Adib Rowhani Andrew Walker
Links	Plant Viruses Online UC Pest Management Guidelines: Grape Nematodes
Publications	Golino, D., Uyemoto, J., and Goheen, A. 1992. Grape Virus Diseases. Pages 101-109 in: Grape Pest Management, 2nd edition. University of California Division of Agriculture and Natural Resources Publication 3343, Oakland, CA. Weber, E., Golino, D.A. and Rowhani, A. 2002. Laboratory testing for grapevine virus diseases (PDF). Practical Winery and Vineyard XXII (2):13-26.

This website is a work in progress of the University of California (UC) Division of Agricultural and Natural Resources (ANR) Integrated Grape Production Workgroup. It is designed to increase accessibility to the work of UC researchers, including faculty, Cooperative Extension (CE) specialists, CE advisors, and staff. UC Researchers interested in contributing content are invited to contact Deborah Golino daqolino@ucdavis.edu to discuss possible contributions.

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Powdery mildews

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Powdery mildews are a group of related fungi which attack a wide range of plants, causing a white, dusty coating on leaves, stems and flowers.

What is powdery mildew?

Powdery mildew is a fungal disease of the foliage, stems and occasionally flowers and fruit where a superficial fungal growth covers the surface of the plant.

Very many common edible and ornamental garden plants are affected including [apple](#), [blackcurrant](#), [gooseberry](#), [grapes](#), crucifers, [courgettes](#), [marrows](#), [cucumbers](#), [peas](#), grasses (the powdery mildew fungi are major pathogens of cereal crops), [Acanthus](#), [delphiniums](#), [phlox](#), many ornamentals in the daisy family, [Lonicera](#) ([honeysuckle](#)), [rhododendrons](#) and [azaleas](#), [roses](#) and [Quercus robur](#) ([English oak](#)).

Powdery mildews usually have narrow host ranges comprising of just a few related plants. For example, the powdery mildew affecting peas is a different species from the one attacking apples.

Symptoms

You may see the following symptoms:

- White, powdery spreading patches of fungus on upper or lower leaf surfaces, flowers and fruit
- Tissues sometimes become stunted or distorted, such as leaves affected by [rose powdery mildew](#)
- In many cases the infected tissues show little reaction to infection in the early stages, but in a few specific cases, for example on [Rhamnus](#), the infection provokes a strong colour change in the infected parts, which turn dark brown

Quick facts

Common name

Powdery mildews

Scientific name

Various

Plants affected

Many plants

Main symptoms

White, dusty coating on leaves, stems and flowers

Caused by

Fungus

- Sometimes the fungal growth is light and difficult to see despite discolouration of the plant tissues, e.g. on the undersurface of [rhododendron](#) leaves

Control

Non-chemical control

Destroying fallen infected leaves in autumn will reduce the amount of infectious spores next spring. [Mulching](#) and watering reduces water stress and helps make plants less prone to infection. Promptly pruning out infected shoots will reduce subsequent infection.

Most powdery mildew fungi have a host range restricted to a relatively few, related plants, but these can include wild relatives which can be sources of infection, e.g. wild crab apples may be sources of infection for apple orchards.

Seed producers sometimes offer powdery mildew-resistant cultivars of both vegetables and ornamental plants, check catalogues for details.

Chemical control

Because most of the growth of powdery mildews is found on the plant surface they are easily targeted with fungicides.

Edibles and ornamentals: Myclobutanil (Bayer Garden Systhane and various other products) can be used on ornamentals, apples, pears, gooseberries and blackcurrants. Difenoconazole (Westland Plant Rescue Control concentrate) can be used on ornamentals, pome fruits and grape vine.

Ornamentals only: Myclobutanil (Westland Rose Rescue and various other products, all as ready-to-use sprays) Difenoconazole (Westland Plant Rescue Control ready-to-use spray), tebuconazole (Bayer Garden Multirose Concentrate 2) and triticonazole (Scotts Fungus Clear Ultra) can be used on ornamentals. The formulation of tebuconazole (Bayer Garden Multirose Concentrate 2) contains deltamethrin and some formulations of triticonazole (Scotts Roseclear Ultra and Scotts Roseclear Ultra Gun) contain acetamiprid to control insect pests. Avoid these unless an insect pest problem is specifically identified.

Plant and fish oil blends (Vitax Organic 2 in 1) may be used on all plants.

Download

[Fungicides for gardeners](#) (Adobe Acrobat pdf document outlining fungicides available to gardeners)

Biology

Powdery mildew fungi produce microscopic air-borne dispersal spores from the fungal growth on the plant surface. These have an unusually high water content, enabling them to infect under drier conditions than most other fungal pathogens. Powdery mildews therefore tend to be associated with [water stress](#).

The majority of the growth of most powdery mildews is found on the plant surface. The fungus sends feeding structures into the surface cells, greatly reducing the vigour of the plant. The growth of a few powdery mildew species (e.g. that affecting hazel) is found deeper in the plant tissues.

Powdery mildews either spend the winter as dormant infections on green tissues, or as resting structures on fallen leaves which then release spores the following spring.



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Assignment: Vine Disease

Name _____

Date _____

Choose one of the main diseases that affecting grape vines (i.e. Powdery Mildew, Botrytis Bunch Rot, Crown Gall, or Fan Leaf Virus) and write a short paragraph about each explaining (1) how this disease affects the grape vine and (2) three potential prevention or control measures for the disease you chose. Be sure to cite all sources used in your answer.

Lesson Plan: Vine Influences

Objectives:

- Know the common influences on grape vines (i.e. climate, site, water, soil nutrients)
- Understand site selection when starting a new vineyard
- Identify the key soil nutrients for grapes
- Understand irrigation and fertilization plans for a vineyard based on the site and variety

Readings:

Strik, B.C. 2011. Growing Table Grapes. OSU Extension Publication EC1639.

<http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/21285/ec1639.pdf>

Activities:

- Students will work in small groups to come up the requirements for starting a new vineyard, including location selection (and why) and any irrigation and fertilization plans based on the grape type assigned

Growing Table Grapes

Bernadine C. Strik



Grapes are a popular choice for the home garden. You can use the fruit in many ways, and properly managed grapevines are great additions to the home landscape. Though grapes can be grown throughout Oregon, they are considered temperate zone plants, requiring a cool winter to meet chilling requirements and a warm growing season (150 to 180 frost-free days) to develop and mature a crop.

Not all **cultivars** (varieties) are suited to a specific region. If the growing season is too short for a particular cultivar, the fruit may be of poor quality and low in sugar content at harvest. Also, the vines may not mature properly in the fall, leading to possible winter injury. In the cooler climate of the coast and the Willamette Valley, avoid choosing late-ripening cultivars. In eastern Oregon, choose only cold hardy cultivars and manage vines to reduce risk of winter cold injury (see “Choosing a cultivar,” page 4).

Along with choosing a site and cultivar, you should also consider site preparation, planting, general planting management, pruning and training, harvesting, and pest management.

In many ways, grapevines are easy to grow, but you need to give the vines very good care to produce high-quality fruit. The hardest parts of grape production are pruning and training. To prune well and properly, you must have an understanding of grape growth.

This publication is for the home gardener or small-scale grower. For information on establishing a larger vineyard, refer to commercial production guides for wine grape growers (see “For further reading,” page 24).

Bernadine C. Strik, Extension berry crops professor, Department of Horticulture, Oregon State University

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Assessment: History and Classification Quiz

1. What is *Vitis vinifera*?
2. What is a Cultivar?
3. When is a grape ripe?
4. How is a new Cultivar made?
5. Name two grape families that are prone to mutation.

Assignment: Fill in the following table to compare phloem and xylem

Name _____

Date _____

	<i>Xylem</i>	<i>Phloem</i>
<i>Made of</i>		
<i>Cell wall thickness</i>		
<i>Cell wall material</i>		
<i>Permeability</i>		
<i>Cytoplasm?</i>		
<i>Transports...</i>		
<i>Carried to...</i>		
<i>Direction of flow</i>		
<i>Tissue also has...</i>		

Assessment: Vine Influences Quiz

1. The climate of a region encompasses what factors?
2. What average temperature do vines prefer?
3. What average temperatures do **white** grapes need to ripen??
4. What average temperatures do **red** grapes need to ripen?
5. Between what general latitudes do grapes ripen?

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