

Top 10 Pathogenic Diseases

-Woody Ornamentals-

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Plant Diseases

Disease – *anything that affects the normal function of the plant.*

- Biotic – caused by living organisms
 - Bacteria
 - Viruses
 - Fungi
 - Nematodes
- Abiotic – caused by non-living stresses
 - Environmental / temperature extremes
 - Soil properties / pH
 - Chemical damage / salt injury
 - Mechanical damage





3 Steps in Diagnosing Diseases...

- 1- Know the plant affected.
- 2- Know the reported diseases.
- 3- Know where to get help.



USU Extension - Helps



- Utah Plant Pest Diagnostic Lab (UPPDL)
 - Located on Logan campus
- Sample submission is only \$5.00
 - Insect pest identification
 - Plant diseases identification

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UTAH PESTS

Utah's diverse landscape supports thousands of insects and plant pathogens. **UTAH PESTS** is your portal for learning more about pests and their beneficial counterparts around the state, and how Utah Extension personnel are working to provide a greater understanding of these organisms in our world.

Click on one of the web site links below to get started!



[integrated pest management](#)

Choose this site for the [plant pest advisories](#), the [IPM Mini-Grant program](#), [weather data](#), and much more.



[plant diseases](#)

Choose this site for a multitude of fact sheets on diseases and disorders of [field crops](#), [fruits](#), [ornamentals](#), [turf](#), and [vegetables](#).



[insects and their relatives](#)

This site will help to shed some light on the insect world, with [fact sheets](#), [images](#), [slide shows](#), and more.



[utah plant pest diagnostic lab](#)

The UPPDL, the only lab of its kind in Utah, is here to identify and provide management recommendations for your pest problems.

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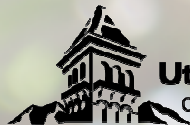
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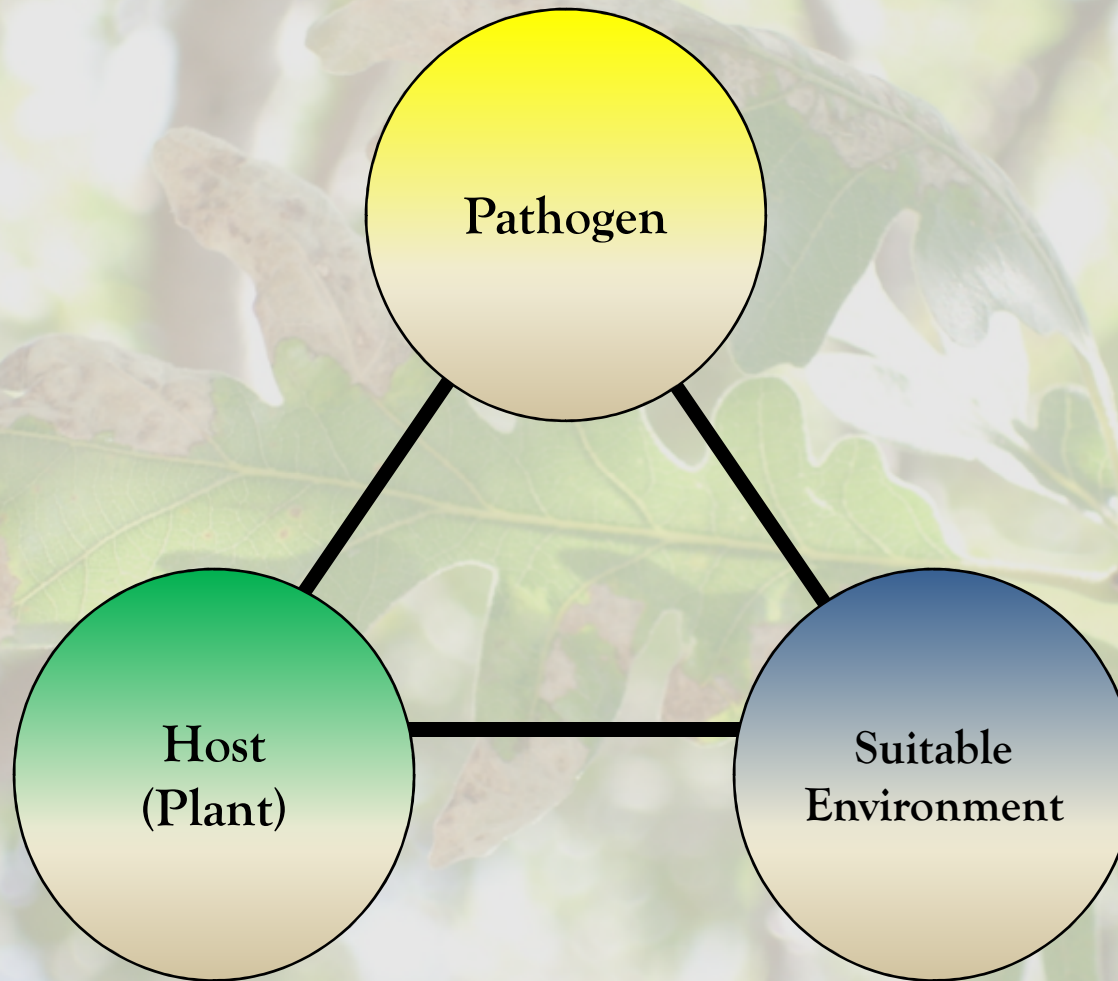
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The Disease Triangle



*All three need to be present to have a disease

Top 10 Pathogenic Diseases

- Verticillium wilt
- Aspen leaf spot
- Anthracnose
- Fire blight
- Powdery mildew
- Slime flux
- Root rot
- Cytospora
- Crown gall
- Coryneum Blight

Verticillium Wilt

Symptoms:

- Random branch die-back
- Dark streaking in sap wood
- Marginal burning on leaves

Cause:

- Fungus: *Verticillium spp*
 - soil-borne fungus
 - clogs plants conductive tissues
 - restricts water movement

Remedies:

- Avoid injuring roots when planting
- Keep plants as healthy as possible
- Prune out infected branches
- Plant resistant species



Resistant Trees (not immune)

<u>Common Name</u>	<u>Genus</u>	<u>Common Name</u>	<u>Genus</u>
Apple	<i>Malus</i>	Mulberry	<i>Morus</i>
Beech	<i>Fagus</i>	Oak	<i>Quercus</i>
Birch	<i>Betula</i>	Pear	<i>Pyrus</i>
Crabapple	<i>Malus</i>	Pines	<i>Pinus</i>
Fir	<i>Abies</i>	Poplar	<i>Populus</i>
Hawthorne	<i>Crataegus</i>	Spruce	<i>Picea</i>
Honey Locust	<i>Gleditsia</i>	Sycamore	<i>Platanus</i>
Linden	<i>Tilia</i>	Walnut	<i>Jugulans</i>
Mountain Ash	<i>Sorbus</i>	Willow	<i>Salix</i>
		Zelkova	<i>Zelkova</i>

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Aspen Leaf Spot

Symptoms:

- Small brown spots with yellow margins
- May kill entire leaf if severe
- Prominent during cool, wet springs
- Reduced tree vigor
- Dropping leaves

Cause:

- Fungus: *Marssonina populi*
 - prominent during cool, wet springs

Remedies:

- Avoid wetting foliage during irrigation
- Increase air circulation in the tree canopy
- Rake up and destroy infected leaves.
- Preventative fungicide during bud break



Aspen Leaf Spot

Chemical	Active Ingredient	Product
tetrachloroisophalonitrile	chlorothalonil	Broad spectrum fungicide Daconil Daconil Lawn and Garden Fungicide
copper	copper sulfate, lime	Bordeaux mixture
fixed copper	copper hydroxide basic copper sulfate copper oxychloride sulfate	Kocide 101, Champ Microcop, Tri-basic WP COCS, Copro

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Anthracnose

Symptoms:

- Commonly found in sycamore, maple, oak, and ash
- Water-soaked lesions on leaves (usually along veins)
- Witches broom effect on branches
- Dropping leaves
- Reduced tree vigor



Cause:

- Various fungal pathogens (host specific)
 - prominent during cool, wet springs

Remedies:

- Damage usually not fatal
- Rake up and destroy leaves
- Prune to improve air circulation
- Preventative fungicide during wet springs





Table 1 Registered products as of January 2000.

Chemical		Rate	Notes
Banner MAXX	Maple	5 to 8 fl oz/100gal water	24 hour re-entry
	Sycamore	6 to 8 fl oz/100gal water	24 hour re-entry
	Oak	16 oz/100gal water	Test on small portion of tree before complete application. 24 hour re-entry.
Champ Formula 2	Sycamore	1.3 to 2 pints/Acre	24 hour re-entry
Cleary's 3336 WP	Maple	12 to 16 oz/100 gal water	12 hour re-entry
	Sycamore	12 to 16 oz/100 gal water	Apply resistance management strategies. Alternate fungicides. 12 hour re-entry
	Oak	12 to 16 oz/100 gal water	12 hour re-entry
	Ash	12 to 16 oz/100 gal water	12 hour re-entry
Daconil Weather Stik	Maple	1.4 pints/100 gal water	Daconil 12.5% can be used on Sycamore and Ash in home gardens. 48 hour re-entry.
	Sycamore		
	Oak		
	Ash		
Fore (80% mancozeb)	Maple	1.5 lb/100 gal water	24 hour re-entry
	Oak		
	Ash		
Kocide DF	Sycamore	2 to 3 lb/Acre	24 hour re-entry
Nu-Cop 50DF	Sycamore	2 to 3 lb/100 gal water	24 hour re-entry
Bayleton	Consult current label for this fungicide before use.		

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Fire Blight

Symptoms:

- Common on apple, pear, hawthorn, cotoneaster, pyracantha, mountain. ash.
- Scorched appearance on leaves, blossoms, and shoots
- Shepherd's crook on terminal growth
- Bacterial oozing may be present
- Dark and sunken areas in the bark

Cause:

- Bacteria: *Erwinia amylovora*
 - active during warm, wet springs
 - spread to blooms by pollinators and splashing rains
 - enters primarily through blossoms

Remedies:

- Prune out infected wood 8-12" below visual damage
(Only during dry weather)
- Remove pruned wood to avoid spreading
- Preventative bactericide during bloom



Fire Blight

- During flower if there is *moisture* and temperatures are above *62 degrees*.
 - streptomycin sulfate (Fire Blight Spray)
 - fixed coppers
 - Bordeaux
 - basic copper sulfate

*Follow label directions listed for ornamentals.



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Slime Flux

Symptoms:

- Common on elm, poplars, maples, willow, mulberry.
- Also referred to as bacterial wet wood
- Oozing from wound
- Rancid odor
- Insects attracted to discharge

Causes:

- bacteria complex
 - enters through wounds

Remedies:

- Select resistant trees
- Consider tree removal
- 10% bleach solution to reduce mess



Slime Flux

Heartwood Infections	Bark/Cambial Infections
Elm	Willow
Cottonwood	Mountain Ash
Poplar	Aspen
Boxelder	Poplar
Russian Olive	Fruitless Mulberry
Ash	

“If the infection encompasses more than half of the trunk, it is probably best to *treat with a chain saw at ground level* and start over again with a less susceptible tree.”

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Powdery Mildew

Symptoms:

- White powder on leaf or bud surface
- Reduced vigor of plant
- Distorted flowers / leaves
- Chlorotic tissue

Causes:

- Various fungal pathogens (host specific)
 - prominent during cool wet periods
 - common in shady locations
 - spread by wind and rain

Remedies:

- Select resistant plant varieties
- Reduce over-head irrigation
- Increase air circulation
- Tolerate late season infections
- Recommendations for control include:
 - potassium bicarbonate
 - copper sulphate
 - registered fungicides



Powdery Mildew

MATERIALS EFFECTIVE IN CONTROLLING POWDERY MILDEW

Chemical	Common (trade) Name	Notes
Thiophanate-methyl	Cleary 3336	
Dodemorph-acetate	Milban	Available in large packages.
Funginex	Ortho Funginex, Rose disease control	Excellent mildew control, especially on roses.
Triadimefon	Bayleton	Excellent systemic control of mildew. Only available in large packages.
Sulfur	Various trade names	May damage foliage in hot weather.

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Root Rot

Symptoms:

- Poorly supported plants
- Slow growth / poor establishment
- Iron chlorosis
- Pungent soil odor
- Water-soaked / discolored roots
- Wilting and eventual death



Causes:

- Various fungal pathogens
 - over-irrigated soils
 - heavy clay soils
 - poor drainage



Remedies:

- Reduce irrigation
- Improve drainage / aeration
- Select adapted plant species
- Plant in elevated berms

Cytospora

Symptoms:

- Attacks wounded wood
- Small black or orange blisters
- Wood decay and dieback
- Can spread to healthy wood

Causes:

- Various fungal pathogens
 - enters through wounds

Remedies:

- Maintain healthy plants
- Reduce physical damage
- Prune out infected limbs
- Proper pruning practices



Crown Gall

Symptoms:

- Occurs on many trees
- Affects roots and trunk
- Swollen, misshapen areas (burls)

Causes:

- Bacteria: *Agrobacterium tumefaciens*
 - soil-borne bacteria
 - enters through wounds

Remedies:

- Eliminate mechanical damage to trunk and roots
- Usually girdles the tree in time



Coryneum Blight

Symptoms:

- Common on ornamental cherry, plum, almond
- Small round lesions
- Girdling cankers on twigs
- Gumming may be present



Causes:

- Fungus – *Wilsonmyces carpophilus*
- prominent during cool, wet springs



Remedies:

- Prune out infected limbs
- Apply registered fungicides:
 - fall @ 50% leaf drop
 - spring just after bloom

stem canker



Coryneum Blight – Shothole

Chemical	Active ingredient(s)	Rate (always read the label)	Timing of application
Abound ¹	Azoxystrobin	11-15 fl. oz./acre/season	See label.
Pristine	Pyraclostrobin + Boscalid	14.5 oz./acre (do not exceed 5 applications per season, see label)	See label.
Gem	Trifloxystrobin	6-8 oz./acre	See label.
Echo 720	Chlorothalonil	3.125 to 4.125 pints/acre	See label. Fall application
Bravo Weather Stik	Chlorothalonil	3.125 to 4.125 pints/acre	See label. Fall application.
Ziram 76DF	Ziram (a zinc compound, see label)	See label, varies by crop.	See label. Varies by crop.
HI-YIELD Bordeaux mix fungicide ²	copper sulfate + lime (a mixture of 8 lb copper sulfate + 8 lb lime/100 gal water)	See label.	See label. Fall application
Kocide 2000 ²	copper hydroxide	See label, varies by crop.	See label. Fall application
Basic copper 53 ²	basic cupric sulfate	See label.	See label. Fall application
C-O-C-S WDG ²	basic cupric sulfate + copper oxychloride	See label.	See label. Fall application

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