



Disease and Insect Resistant Ornamental Plants

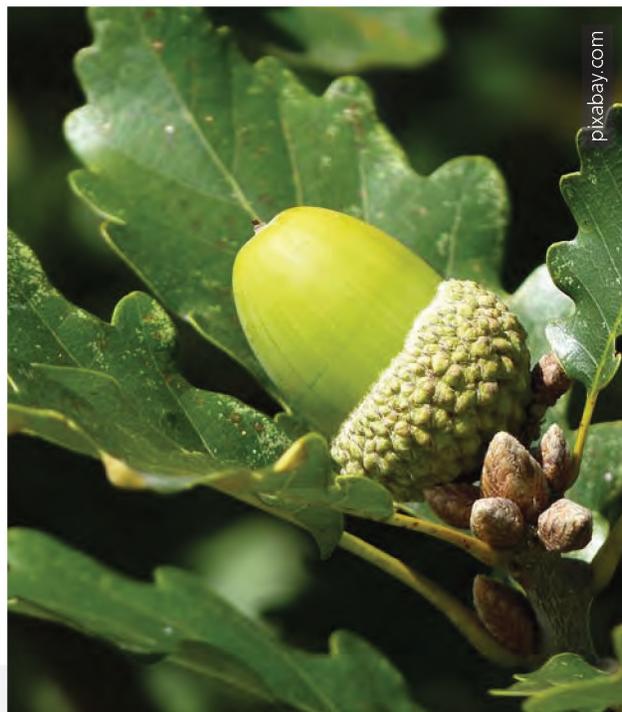
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QUERCUS

Oak

Quercus is a large genus containing hundreds of species of trees and shrubs commonly known as oaks. Found worldwide, oaks are one of the most versatile and widely used landscape plants.

Oaks can be divided into two main groups, red and white. Since some diseases are restricted to or are more common in one group than the other, it's helpful to know the difference. Leaf shape is typically a reliable way to tell them apart. Species in the red oak group have leaves with pointed lobes and species in the white oak group have leaves with rounded lobes.



DISEASES

Anthracnose is a common leaf disease of *Quercus* spp. caused by the fungus *Apiognomonia quercina*. Prevalent following cool, wet spring weather, symptoms appear as irregularly-shaped spots on leaves which may coalesce into larger brown blotches. Sometimes confused with oak wilt, infection from anthracnose on oak is limited to the cool weather of the spring and will not cause lasting damage to otherwise healthy trees. White oak (*Q. alba*) is highly susceptible (4, 20).

Anthracnose		
Species	Cultivar	Reference
		Resistant
<i>Quercus bicolor</i>	American Dream® ('JFS-KW12')	7
<i>Quercus macrocarpa</i>	Cobblestone® ('JFS-KW14')	8
	Urban Pinnacle® ('JFS-KW3')	2, 3, 9
<i>Quercus palustris</i>		4

Bacterial Leaf Scorch is a systemic, potentially fatal disease of susceptible plants, including *Quercus* spp., caused by the bacterium *Xylella fastidiosa*. It is most common in southern states and currently limited to warmer locations in the Northeast. Infection interferes with water supply to leaves causing leaf scorch, premature leaf drop and death of branches. The disease is spread by insects such as leafhoppers and spittlebugs (23). Susceptible species include *Q. alba*, *Q. falcata*, *Q. imbricaria*, *Q. laurifolia*, *Q. nigra*, *Q. palustris*, *Q. rubra* (2), and it has also been reported on *Q. virginiana* (17).

Oak Leaf Blister, also known as *Taphrina* blister, is a common disease of *Quercus* spp. caused by the fungus *Taphrina caerulescens*. Favored by cool, wet springs, symptoms appear as yellow to reddish-brown blisters on the upper leaf surface with corresponding gray depressions on the lower surface. Damage is cosmetic and does not affect overall health of the tree. Species in the red oak group are more susceptible than those in the white oak group (19).

Oak Wilt is a systemic and usually deadly disease of *Quercus* spp. caused by the fungus *Ceratocystis fagacearum*. The disease is spread through oak root systems or by insects arriving from infected trees. The fungus grows inside the water conduction tissues, clogging them and causing the decline and death of trees.

Since its discovery in Wisconsin in 1944, oak wilt has spread throughout the Midwest and Texas. In New York, it was first identified in Schenectady county in 2008 and in Suffolk and Ontario counties in 2016 (20). Detection at two new locations in Schenectady county was confirmed by the NYS Department of Environmental Conservation in November 2017 (18).

Management strategies include avoidance of pruning in spring and summer, covering any wounds with paint, removal of infected trees and appropriate disposal of the wood, trenching to sever root connections and restrictions on movement of firewood. For more information about oak wilt in New York, visit the Cornell University Plant Disease Diagnostic Clinic website at plantclinic.cornell.edu/oakwiltpage.

In NYS, if you suspect oak wilt, contact the Department of Agriculture and Markets–Division of Plant Industry or the Department of Environmental Conservation Forest Health. Ag and Markets–Plant Industry can be reached via email at plants@agriculture.ny.gov or by phone at 518-457-2087. You can email the DEC Forest Health office at foresthealth@dec.ny.gov or call 1-866-640-0652. You can also submit samples to your local Cornell Cooperative Extension office.

There is a wide range of susceptibility to *C. fagacearum* within the genus *Quercus*. In general, species in the red oak group, including *Q. coccinea*, *Q. ellipsoidalis*, *Q. rubra* and *Q. velutina*, are more susceptible than species in the white oak group. Highly susceptible exceptions in the white oak group include *Q. fusiformis*, *Q. virginiana* and some European oaks (23).

Powdery Mildew is a common fungal disease caused by *Erysiphe* spp., most active during periods of warmth and high humidity. The white, powdery growth on leaves is rarely a serious problem on oaks. Trees planted in full sunlight with good air circulation are less likely to be infected. Many oak species can be infected, but *Q. alba*, *Q. robur* and *Q. robur* ‘Fastigiata’ are more susceptible (2).

Powdery Mildew		
Species/Hybrids	Cultivar	Reference
		Resistant
<i>Quercus bicolor</i>	American Dream® ('JFS-KW12')	7
<i>Quercus macrocarpa</i>	Cobblestone® ('JFS-KW14')	8
	Jordan Street® ('Atwood')	2, 3
	Urban Pinnacle® ('JFS-KW3')	2, 3, 9
<i>Quercus robur</i>	Rosehill® ('Asjes')	2
	Skyrocket® ('Fastigiata')	2
	Triple Crown® ('Taylor')	2
	Walkenbach™ ('Adeline')	2
<i>Quercus robur</i> x <i>alba</i>	Crimson Spire™ ('Crimschmidt')	2, 12
	Streetspire® ('JFS-KW1QX')	13
<i>Quercus robur</i> x <i>bicolor</i>	Kindred Spirit® ('Nadler')	2, 3, 14
	Regal Prince® ('Long')	2, 3, 15

Powdery Mildew		
Species/Hybrids	Cultivar	Reference
		Resistant
<i>Quercus x bimundorum</i>	Prairie Stature™ ('Midwest')	10
<i>Quercus x macdanielli</i>	Heritage® ('Clemons')	2, 11, 21

Sudden Oak Death is a disease of *Quercus* spp. caused by *Phytophthora ramorum*. First reported in the US near San Francisco, California in 1995, it has since spread to other areas on the West Coast (21). In oak, the pathogen infects the bark causing trunk cankers that eventually girdle and kill the tree. Species in the white oak group do not appear to be susceptible to the disease (4).

While the known range of this disease of oaks in the US remains on the West Coast, the pathogen also causes foliar blight and twig lesions (ramorum blight) on a wide range of hosts, including *Kalmia*, *Pieris*, *Rhododendron*, *Camellia* and *Viburnum*. To prevent introduction of the pathogen to other parts of the country through shipment of nursery stock, it is important to confirm the source has been tested.

In NYS, if you suspect sudden oak death symptoms, contact the Department of Agriculture and Markets–Division of Plant Industry or the Department of Environmental Conservation Forest Health. Ag and Markets–Plant Industry can be reached via email at plants@agriculture.ny.gov or by phone at 518-457-2087. You can email the DEC Forest Health office at foresthealth@dec.ny.gov or call 1-866-640-0652.

INSECTS

Orangestriped Oakworm, *Anisota senatoria*, is a native moth species that can be a serious pest of oak trees in forests, nurseries and landscapes. Oaks are preferred hosts, but maple, hickory, birch, filbert and hazelnut are also susceptible (1, 16). Leaves may be skeletonized or completely consumed by larval feeding, and major outbreaks have been reported in Connecticut, Maryland, Michigan, New Jersey, New York and Pennsylvania (7, 22).

Researchers at Virginia Polytechnic Institute evaluated 11 oak species for host plant suitability by *A. senatoria*.

Orangestriped Oakworm			
Species	Reference		
	Resistant	Intermediate	Susceptible
<i>Quercus acutissima</i>			1
<i>Quercus alba</i>	1		
<i>Quercus bicolor</i>		1	
<i>Quercus coccinea</i>			1
<i>Quercus falcata</i>		1	
<i>Quercus macrocarpa</i>		1	
<i>Quercus nigra</i>		1	
<i>Quercus palustris</i>			1
<i>Quercus phellos</i>			1
<i>Quercus prinus</i>		1	
<i>Quercus rubra</i> var. <i>borealis</i>			1

Gypsy Moth, *Lymantria dispar*, caterpillars can cause extensive defoliation on many plant species, but oaks are preferred hosts (13). Researchers at the University of Kentucky evaluated gypsy moth larval preference for eight oak species. Preference was greatest for *Q. macrocarpa* and *Q. velutina* and least for *Q. palustris*, *Q. phellos* and *Q. rubra* (5).

Japanese Beetle, *Popillia japonica*, is a foliage feeder of many landscape plants. Feeding on *Q. alba*, *Q. coccinea*, *Q. falcata*, *Q. prinus*, *Q. rubra*, *Q. stellata* and *Q. velutina* has been observed but is reported to be either occasional or light—*Q. palustris* is commonly fed on and may occasionally sustain moderate damage (6).

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OTHER RESOURCES

"Missouri Botanical Garden." missouribotanicalgarden.org

"Woody Plants Database." *Urban Horticulture Institute*, Cornell University. woodyplants.cals.cornell.edu/plant/search



Cornell Cooperative Extension

Produced by the New York State Integrated Pest Management Program, which is funded through Cornell University, Cornell Cooperative Extension, the New York State Department of Agriculture and Markets, the New York State Department of Environmental Conservation, and USDA-NIFA. Design by Karen English, New York State IPM Program. Cornell Cooperative Extension provides equal program and employment opportunities. © 2019 Cornell University and the New York State IPM Program. Updated 3/2019. Search for this title at the NYSIPM Publications collection: ecommons.cornell.edu/handle/1813/41246

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