

*"This is an absolute 'must have' for all professional tree people. A complete and thorough revision of the classic, it contains more than 2,000, digitally optimized color images of all important diseases of trees and woody ornamentals of the US and Canada.*

XHT What is Verticillium wilt? Verticillium wilt is a typically fatal disease that affects a wide range of deciduous woody ornamentals in Wisconsin. Trees most commonly and severely affected are maple and ash. Other trees and shrubs such as barberry, catalpa, elm, lilac, linden, smoke-tree and redbud susceptible. Sudden yellowing, wilting and death of leaves and branches, particularly starting in one section of a tree or shrub, is a typical symptom of Verticillium wilt. What does Verticillium wilt look like? The first signs of Verticillium wilt that you may notice are individual branches that suddenly wilt and die. Affected branches may occur on one side of the tree or may be scattered throughout the tree. If you carefully peel away the bark of these branches, you may see brown or green streaking in the sapwood just under the bark. Streaking is common in trees such as maple or redbud, but often is not visible in ash and lilac. Where does Verticillium wilt come from? Verticillium wilt is caused primarily by two fungi, *Verticillium dahliae* and *Verticillium albo-atrum*. These fungi are commonly found in Wisconsin soils and in roots, branches and leaves of infected plants. These fungi enter trees and shrubs through their roots and grow in the xylem. This lack of water movement is what eventually leads to wilting. How do I save a tree or shrub with Verticillium wilt? Trees and shrubs infected with Verticillium cannot be cured and will likely eventually die. However, you can extend the life of your plants by making sure that you water and fertilize properly. Make sure established trees and shrubs receive approximately one inch of water per week. If rainfall is insufficient, use a drip or soaker hose to apply supplemental water. Fertilize trees as needed, but be sure to base any fertilization on a soil nutrient test. To prevent competition for water and nutrients, remove lawn grass within the drip line of your trees and shrubs. On heavy clay soils, use three inches of mulch. On other soils, use three to four inches of mulch. Be sure to keep mulch two inches from the main trunks and crowns of trees and shrubs. In addition, prune out dead branches as they occur. Dispose of these branches by burning where allowed by local ordinance or landfilling them. DO NOT bury or compost these branches. Rubbing alcohol and many spray disinfectants contain approximately this alcohol concentration. Decontaminating your tools will help prevent spread of Verticillium from branch to branch, or more importantly from tree to tree, as you prune. Internal streaking in the sapwood of a branch is typical of Verticillium wilt. How do I avoid problems with Verticillium wilt in the future? The best way to avoid Verticillium wilt is to plant trees and shrubs that are immune or resistant. Lyon Comstock Publishing Associates, include apple, aspen, azalea, beech, birch, butternut, crabapple, dogwood, flowering quince, ginkgo, hackberry, hawthorn, hickory, holly, honeylocust, katsura tree, mountain-ash, oak, pear, poplar, sweetgum, sycamore, walnut, and willow. Also, DO NOT use mulches that may have been produced from infected trees or that are of unknown composition. Finally, immediately collect and discard leaves that have fallen from symptomatic trees. Both mulch and leaves are potential sources of Verticillium. For more information on Verticillium wilt: This document can be provided in an alternative format by calling Brian Hudelson at for Wisconsin Relay. References to pesticide products in this publication are for your convenience and are not an endorsement or criticism of one product over similar products. Follow directions exactly to protect the environment and people from pesticide exposure. Failure to do so violates the law.

### Chapter 2 : Diseases of Trees and Shrubs : Wayne A. Sinclair :

*Quick facts. Leaf spot diseases weaken trees and shrubs by interrupting photosynthesis. Most leaf spot diseases affect only a small percentage of the tree's overall leaf area, and are a minor stress on the health of the tree.*

Be aware of the signs and symptoms of the most common diseases so you will know right away if there is a potential problem. Recognizing the disease early and taking quick action could mean the difference between saving or replacing a favorite evergreen shrub or tree. Cankers Cankers are a common problem for evergreens. The general symptoms of cankers are sunken dead patches on the bark and brown or yellow wilting leaves. The cankers may ooze resin or there may be fungus growing on the canker. Cankers can be obviously discolored or barely noticeable. They can occur on the branches and trunks of evergreens. When the cankers are on a branch, prune the branch off. Disinfect the pruning saw or loppers with household disinfectant before using them and between each cut to avoid spreading the disease. Wipe the disinfectant off the cutting tools before using them on the tree. Evergreens with cankers on the trunk will usually die. Evaluate and remove them, if necessary. Crown, Collar and Root Rots Evergreens are susceptible to crown, collar and root rots. The symptoms are similar to those for drought stress. The evergreen will wilt, foliage will be stunted, turn yellow or brown and drop. Commonly a canker, stain or streak will run vertically up the trunk. If you cut away the bark, the wood beneath may be gray or brown. There may also be black or red sap that oozes from the discolored area. Older evergreens suffering from rot grow more slowly, branches die off and the entire evergreen commonly dies. Overly wet soil promotes this fungal disease. It may be possible to save the evergreen by carefully digging the soil away from the crown and upper roots and letting them dry out. Rust Evergreens are susceptible to rust diseases. The symptoms of these fungal diseases are powdery-looking orange, red or yellow fungal spores on the needles or leaves. Spores form first on the underside of the leaves but, as the fungus progresses, they move to the top. The leaves may also drop off. On some evergreens, orange spores may look gelatinous. Prune off infected needles, leaves or branches. Remove debris from around the base of the evergreen and dispose of it. Water the evergreen from below the branches and do not wet the leaves. Shoestring Disease Evergreens can develop armillaria root rot, also known as oak root fungus and shoestring disease. It kills the trunk at the base of the evergreen and the major roots. Symptoms of armillaria root rot are small, discolored needles or leaves that drop off. There may also be mushrooms growing on the trunk. Root-type growths that are reddish-brown or black may be found on the root surface or root crown. Entire branches die, commonly at the top of the evergreen first. The whole evergreen may die from this disease. There is no cure. If you remove the evergreen, be sure to remove all of the dead roots from the soil and replace it with something that has good resistance to the disease.

*"Diseases of Trees and Shrubs is by far the best book currently available for the horticulturist, arborist, or forester who wishes to identify disorders of forest and shade trees and woody ornamentals."*—The Public Garden.

Printable PDF Click on images to see larger view Even the most conscientious and hardworking gardener is likely to encounter leaf spot problems on trees and shrubs. The seemingly sudden appearance of brown or black blotches on leaves and defoliation are common occurrences. It is unlikely that most homeowners will make it through a season without at least one problem with a leaf spot pathogen. Although leaf spots can be caused by air pollutants, insects and bacteria et al. Once into the leaf, the fungi continue to grow and leaf tissue is destroyed. Resulting spots vary in size from that of a pinhead to spots that encompass the entire leaf. Dead areas on the leaves are usually brown, black, tan or reddish in color. Occasionally the necrotic areas have a red or purple border. Partial to complete defoliation may occur under favorable conditions for the causal fungus. Life Cycle Many of the leaf spot fungi have a similar life cycle. The causal fungus over-winters on fallen leaves. In the spring, during or following a rain, spores produced by the fungus are discharged and carried by the wind and splashing rain to newly emerging leaves. The spore germinates and penetrates these young tender leaves causing infection. In a few days to several weeks, depending on temperature, small spots appear on the leaves. As the fungus grows, the spots enlarge. The fungus in the spots may produce more spores. These spores are capable of causing secondary infections on other leaves. In general, the leaf spot fungi are favored by cool, wet weather early in the growing season. Leaf spot diseases are seldom a problem following warm, dry weather in the spring. Although coniferous trees needled evergreens can be severely injured by leaf spot fungi, they are rarely attacked in successive years. Therefore, control measures are rarely required. Many different fungi cause a variety of symptoms on hardwood trees and shrubs. Oak, maple, sycamore, ash, walnut, hickory and horse chestnut are some trees commonly attacked by the anthracnose fungi. Anthracnose is caused by several species of closely related fungi that produce brown or black lesions on leaves. Distortion of the leaves and defoliation usually result. Leaf blister of oak is common following cool, wet spring weather. Many circular raised blisters are scattered over individual leaves. Although unsightly, there is little or no damage to affected trees. Symptoms of fungal leaf spots on elms vary from small, black, pinhead lesions to brown blotches covering an extensive portion of the leaf. As many as ten different leaf spot fungi can be found on rhododendron. Although unsightly, they rarely cause serious injury. The above are a few of the hundreds of leaf spot problems likely to be observed by the home gardener. Control In many cases, the home gardener becomes overly alarmed when encountering a severe leaf spot problem. A common reaction is to run for the sprayer and quickly apply a chemical to the ailing tree. Usually this is a waste of time and money. The majority of trees and shrubs have learned to live with leaf spot diseases. Even severe defoliation will not cause the death of an otherwise healthy tree. Also, by the time symptoms of leaf spot are obvious, it is often too late to apply a chemical for control. Trees, which are subject to serious injury when attacked by a leaf spot fungus, are those trees that are under stress. This might include recently transplanted trees, trees growing under droughty conditions or trees weakened by continuous insect attack. The additional stress of a leaf spot disease on an already weak tree may cause permanent injury or death. In such cases, chemical control of leaf spots is often recommended in the spring. In order to be effective, the proper fungicide must be applied as a protectant before the fungus spore is disseminated to the leaf. Most leaf spot fungi infect trees early in the spring just as the leaves are unfolding. Successful control usually requires two to three spray applications. In general, the first spray is applied at bud break and the second seven to fourteen days after that. A third spray might be necessary, particularly during rainy periods. The more rain the more frequent the spray applications must be. Since many of the leaf spot fungi over-winter on fallen leaves, one cultural method of reducing the severity of leaf spots is to rake and remove from your yard all old leaves under the tree. This will reduce the number of fungal spores available to infect developing leaves in the spring. Disposing of old leaves is not likely to be effective if leaves from the same species of tree or shrub in your area are not disposed because spores of most of the causal fungi can be wind disseminated for long distances.

Despite good cultural practices, pests and diseases at times may appear. Chemical control should be used only after all other methods have failed. For fungicide and pesticide information or other questions please call toll free: The information in this material is for educational purposes. The recommendations contained are based on the best available knowledge at the time of printing. Any reference to commercial products, trade or brand names is for information only, and no endorsement or approval is intended. The Cooperative Extension system does not guarantee or warrant the standard of any product referenced or imply approval of the product to the exclusion of others which also may be available. If the information does not agree with current labeling, follow the label instructions. The label is the law. Read and follow all instructions and safety precautions on labels. Contact the Connecticut Department of Environmental Protection for current regulations. The user of this information assumes all risks for personal injury or property damage. The Connecticut Cooperative Extension System offers its programs to persons regardless of race, color, national origin, sex, age or disability and is an equal opportunity employer.

### Chapter 4 : Shrub Diseases | University of Maryland Extension

*Diseases of Trees and Shrubs is a comprehensive pictorial survey of the diseases of, as well as the environmental damage to, forest and shade trees and woody ornamental plants in the United States and Canada.*

### Chapter 5 : Tree and Shrub Diseases

*Diseases of Trees and Shrubs by Wayne A. Sinclair, Warren T. Johnson, Howard H. Lyon Association of American Publishers Professional and Scholarly Division Award Winner (Life Sciences) First published in , Diseases of Trees and Shrubs has become a standard reference for plant health specialists, plant diagnosticians, horticulturists.*

### Chapter 6 : Diseases of ornamental trees and shrubs - Statewide IPM Program UC ANR

*Diseases of Trees and Shrubs in your Garden Diseases of trees and shrubs. Diseases were grouped into six groups according to the damage they cause with woody plants, namely: foliage diseases, collar and root rots, cankers, vascular wounds, viral diseases and diseases of origin abiotic.*

### Chapter 7 : [www.nxgvision.com](http://www.nxgvision.com): diseases of trees shrubs: Books

*Tree and Shrub Diseases Below are the most common diseases afflicting landscapes. Our research will give you the knowledge to diagnose issues and also offer you solutions with our customized Tree and Shrub services.*

### Chapter 8 : Verticillium Wilt of Trees and Shrubs | Plant Disease Diagnostics Clinic

*It then describes the various diseases of trees and shrubs, specifically yellows disease, stubborn disease, Paulownia witches' broom disease, mulberry dwarf, blueberry stunt, and sandal spike disease.*

### Chapter 9 : Tree and Shrub common insects, diseases, and other problems

*For noncommercial purposes only, any Web site may link directly to this page. FOR ALL OTHER USES or more information, read Legal [www.nxgvision.com](http://www.nxgvision.com)unately, we cannot provide individual solutions to specific pest problems.*