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What is it?

Verticillium wilt is a vascular disease which attacks a wide variety of trees, shrubs and herbaceous ornamentals. The disease is caused by a fungus, *Verticillium albo-atrum*, which lives in the soil and enters the plant through the roots. In the plant, the fungus spreads upward, mainly in the wood, disrupting water movement and normal plant functions.

Symptoms

The disease may appear in mild, chronic or lethal form. Poor vigor and sparse growth may be the only symptoms (Fig. 1). Yellowing, marginal and interveinal browning, wilting and/or death of leaves may occur. The affected plant typically shows symptoms of mild to severe water stress. These often appear in one branch or one

side or sector of the plant (Fig. 2). In its lethal form Verticillium will cause a sudden and total collapse of the plant. The wood of affected plants shows discoloration in the form of streaks or bands (Fig. 3). These streaks may be scattered throughout the wood if the plant is chronically infected or may be confined to new sapwood in a new attack (Fig. 4). The color of the streaks can be from grayish to olive green (maples), to brown or near black in locust and elm. Streaks should be looked for at the base of the wilted branch or twig or in the trunk or roots on the affected side of the plant.

The above symptoms are not conclusive evidence of Verticillium wilt, as other diseases can cause similar symptoms. Positive identification can be made only by laboratory tests. Contact your County Cooperative Extension Service Office if you wish such tests to be made.

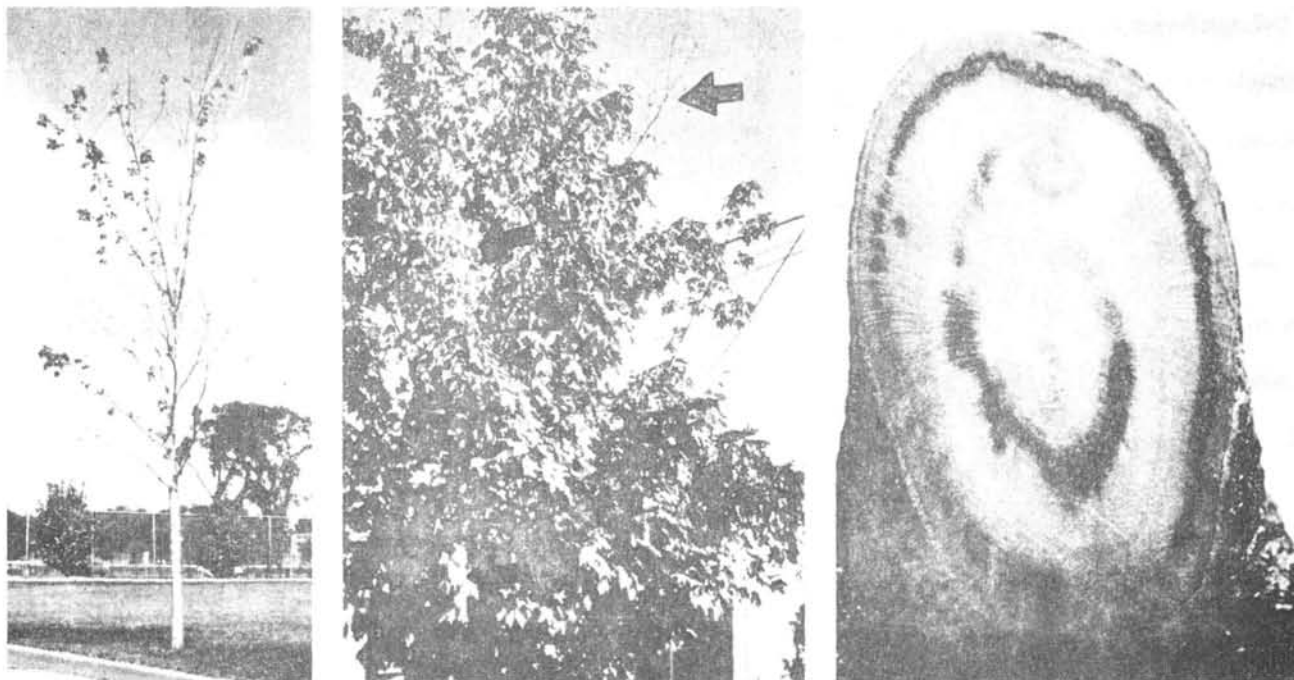


Fig. 1. (Left) Tree with a chronic Verticillium infection. The plant may persist in this condition for several years. Fig. 2. (Center) Note defoliated branch and one-sided flagging (arrows) of Verticillium affected tree. Fig. 3. (Right) Complete ring in current year's growth indicates why this branch died. Note initial Verticillium infection occurred 2 years earlier.

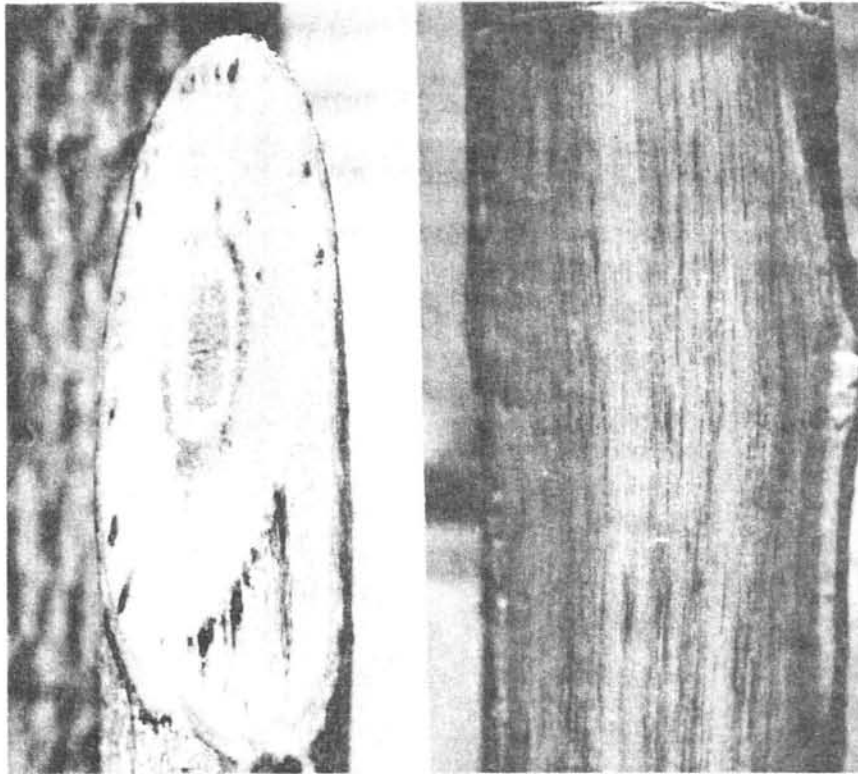


Fig. 4. Scattered streaks indicate a chronic infection, while streaks confined to the current year's growth indicate a new attack.

**Trees and shrubs
known to be susceptible
to Vorticillium wilt:**

Ash, (Black, Blue European,
Green and White)
Azalea (*Rhododendron molle*)
Barberry, Japanese
Boxwood, Korean
Catalpa, Western, Northern
and Southern
Cherry
Elm, American and varieties
Augustine Ascending, Henry
Field, Littleford, and Moline
Chinese (*Ulmus parvifolia*)
English
Slippery
Goldenrain tree
Grapes
Horsechestnut
Kentucky coffee tree
Lilac
Linden, American and Little leaf
Locust, Black
Magnolia, Saucet and Star
Maple, Amur, Black, Hedge,
Norway, and varieties Crimson
King and Schwedleri, Red,
Silver and Sugar
Oak, Pin and Red
Peach
Pear
Plum
Privet, Amut
Redbud
Rose daphne
Rose, Multiflora (most cultivated
roses)
Russian olive
Sassafrass
Smoketree
Sour gum
Spirea
Sumac, Fragrant, Smooth and
Staghorn
Tree-of-heaven
Tulip tree
Viburnum

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**Replacement
Species**

Arborvitae
Beech
Birch
Fir
Flowering crabapple
Ginkgo
Hackberry
Hawthorn
Hickory
Holly
Honey locust
Hop hornbeam
Hornbeam
Juniper
Larch
Mountain ash
Mulberry
Oak, white and burr
Pawpaw (Asimina)
Pine
Poplar
Pyracantha (firethorn)
Serviceberry
Spruce
Sweet gum
Sycamore
Willow
Zelkova

Care of infected plants

There is no chemical cure available for Vorticillium wilt. Trees showing general or severe wilt cannot be saved and should be cut down and disposed of by burning or removal to a dumping area. Infected wood **should not be chipped** (unless it is thoroughly heated in a compost pile manner) as the fungus can live for some time in chips and can grow as a saprophyte in the soil if adequate organic matter is present. In this manner, chip mulch could spread the disease.

Mild and chronically affected trees should be watered regularly to prevent water stress. Nitrogen fertilization to stimulate vigorous growth is also recommended. Prune out and destroy weak and dead branches.

Future plant selection

Where Vorticillium wilt is found or suspected, resistant or tolerant species should be used in replacement plantings. If susceptible species must be used, soil fumigation by a licensed professional is required.

Vorticillium wilt is not known to occur in yews and conifers. Also, a number of broadleaf species are not known to be susceptible to this disease. The species listed in the adjoining left column should be considered as replacement species for plants killed by Vorticillium wilt.