

year's rains has created all kinds of biological activity or lack thereof.

Drought stressed sugar maples were extremely slow and limited in breaking bud on the upper one-third to one-half of the tree. These trees should be watered and fertilized thoroughly to facilitate vegetative growth. By midsummer it should be apparent what is dead and what will continue growing. The dead wood should be removed.

Some drought stress, plus the late hard freeze in Mid April, was significantly injurious to the new growth of many oaks and to some extent growth on green ash. These were set back but have since pushed new buds and appear to be progressing satisfactorily. However, when a second flush is required, it greatly depletes the plant's carbohydrate reserves and decreases its tolerance of any subsequent injuries or diseases.

The birch leafminer, canker worms and the European pine sawfly larvae are certainly taking their toll on trees and shrubs. At this time the feeding period of all three of these insects is about complete so actual treatment of the insect is to no avail. However, some insects such as the birch leaf miner and others will have a second generation hatch about late June. Therefore, it is useful to spray plants with a systemic insecticide according to the label.

This will allow for the building of some insecticide within

the plant as well as provide some contact upon arrival of the pest. Two applications may be necessary. The European pine sawfly larvae were particularly devastating on mugo pine. It would take approximately two days for all the old needles on a 3-foot mugo pine to be completely gone. Aphids were already becoming prevalent by June 10 and if the rain continues, be observant for fungal diseases that will be much more aggressive this year than last year.

Treat with insecticides and fungicides according to the label where potential economic injury exists. However, also use preventive treatments by providing proper cultural practices including watering, fertilizing, aeration of the soil for trees in heavy clay, pruning or anything that enhances the fiber and overall growing conditions for the plant.

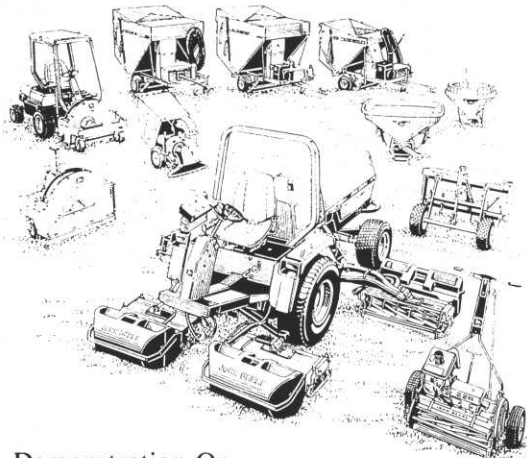
## VERTICILLIUM WILT

### TROUBLING TO SHADE TREES

by **Cynthia Ash & Ward C. Stienstra**  
**MINNESOTA EXTENSION SERVICE**

Ventricillium wilt is a fungal disease which interferes with the water conducting system in shade trees. The fungus

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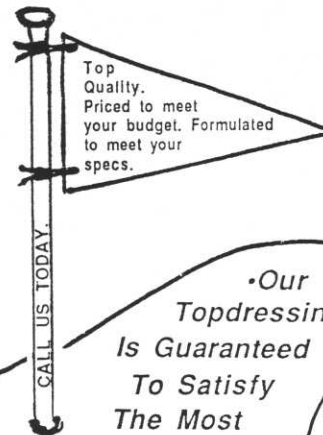
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is soil-borne and enters the plant through wounds in the roots. A natural consequence of having a fungus clogging up the water-conducting system is wilting followed by yellowing and dieback. Trees and shrubs showing partial wilt during the growing season may wilt further and die the following year. Others may recover and not wilt in succeeding years. The pattern depends on the extent of root infection and the severity of other stresses. When most of the roots are infected, the tree may wilt and die before the end of the first summer.

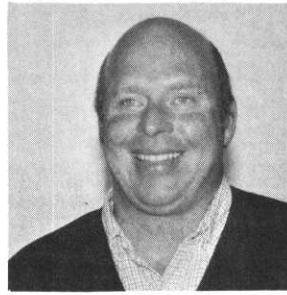
Trees showing general and severe wilt cannot be saved and should be replaced with a nonsusceptible species. Trees with some symptoms may be saved or their life prolonged for some time if they are watered, fertilized with nitrogen, and pruned of dead and wilting branches. Pruning does not eliminate the fungus from the tree, but removes weakened limbs, which may be infected by other fungi.

Trees and shrubs susceptible to Verticillium wilt

- Ash - black, blue, European, green, and white
- Azalea
- Barberry - Japanese
- Boxwood - Korean
- Catalpa
- Cherry
- Coffeetree - Kentucky
- Dogwood
- Elm - American, Chinese, and slippery
- Linden - American and littleleaf
- Locust - black
- Maple - Amur, Norway and varieties, red, silver and sugar
- Oak - pin and red
- Pagoda tree
- Plum
- Rose
- Russian Olive
- Smoke tree
- Sumac - fragrant, smooth, and staghorn
- Viburnum species

The following list of trees and shrubs might serve well as replacements for any trees the fungus kills:

- |             |                     |
|-------------|---------------------|
| Arborvitae  | Juniper             |
| Birch       | Larch               |
| Fir         | Mountainash         |
| Ginkgo      | Oak - white and bur |
| Hackberry   | Pine                |
| Hawthorn    | Poplar              |
| Hickory     | Serviceberry        |
| Honeylocust | Spruce              |
| Hophornbeam | Willow              |



## OFF THE TOP OF MY HEAD

GREG HUBBARD, CGCS  
Editorial Chairman

### DEVELOP AN IRRIGATION PHILOSOPHY - HOLD BACK THE WATER!

As last summer's drought taught us, water availability for golf course use has become a hot issue. As temperatures rose and grass plants withered, water resources suddenly dwindled and watering bans were mandated throughout the state. Where demand did not meet the need, bushes and trees, turfgrass, and mental outlooks suffered. Though many courses have now recovered from the short term drought effects, the long term problem of allocating water supplies fairly continues to grow. Suitable water supplies are becoming more scarce and competition for these limited supplies is growing. The lesson of 1988 is that the economics of water use, like that of the oil crisis in the 70's, will demand that we use this precious resource more sparingly and efficiently in the future. As demand outrips supply, we will be forced to change our water use philosophy. No longer will water be in unlimited supply, readily available for our demands. As ground water reserves and surface water reservoirs become depleted through increased domestic and commercial use, and as pumping costs rise, more pressure will be put on golf courses to reduce their consumption. We will find ourselves at the end of the water main, last in line for this precious commodity. Now is the time to prepare for this eventuality. Now is the time to develop new water management strategies. HOLD BACK THE WATER!

The first step to developing new water management strategies begins with personal commitment, integrating old practices with new ideas. Rather than reacting to short term water supply problems through new wells and improved pumping systems, a long term comprehensive program on both a political and personal level is necessary. Politically, we should attempt to raise our category of water use prioritization to a higher level. Rather than being on the end of the water pipeline, we must actively influence legislative bodies, emphasizing our importance in the local economy over that of our country club image. We must stress our role in fulfilling recreational needs for our ever aging population and for those with more leisure time opportunities. We can also emphasize our importance in the environment, as wild life preserves, air conditioners, and water reservoirs. On a personal level, we must renew our devotion to the basics of turf management. Through the application of proper water conserva-