

## Nitrogen helps wilt-diseased trees recover

NEWARK, Del. — You can't cure a tree once it gets wilt disease, but if the infection is mild, water — not fertilizer — may help it recover. This is the gist of research findings by plant pathologists at the University of Delaware Agricultural Experiment Station.

Results of work on wilt-infected yellow-poplars (tulip trees) by master's degree candidate Carolyn Sanford and her advisor, Dr. Allen L. Morehart, challenge and present practice of fertilizing Verticillium infected trees to aid recovery.

Typical symptoms of this fungus disease are yellowing (chlorosis) and browning (necrosis) of leaves. In very severe cases, Sanford says a tree may die within weeks after contracting the disease. There's nothing the owner can do except cut the tree down and make sure

not to plant another susceptible species in the same place.

With less severe infections, only a branch or two may be affected and the tree may spontaneously recover because it compartmentalizes or walls off the infection inside it.

To increase the vigor of trees with Verticillium wilt, some authorities recommend fertilizing with nitrogen. Nitrogen comes in two basic forms, ammonium or nitrate, and some scientists say only the ammonium form should be used. But there is no universally accepted treatment.

To see what would happen when infected trees were fertilized, Sanford decided to study the effect of both forms of nitrogen on the spread of Verticillium wilt through the vascular system of yellow-poplars.

She chose this species because

the tree is important both for timber and as a landscape specimen. Yellow-poplar is the major wood used in making drawers and backs of chests and other furniture. Because it grows quickly as well as tall and straight, it is the only hardwood species used for reforestation. A member of the magnolia family, it is also prized as a landscape specimen. The tree is very susceptible to Verticillium wilt, though otherwise it has few pests.

Sanford's advisor, Morehart, has been studying the yellow-poplar for some time because of its potential commercial value to Delmarva.

Sanford's experiment involved two greenhouse studies and two field studies. Some of the trees were fertilized and then inoculated with wilt disease. Others were inoculated first, then fertilized.

She used four different forms of nitrogen in her studies: calcium nitrate, ammonium sulfate, ammonium nitrate and urea. Most fertilized groups received a modest rate of 150 pounds per acre, though in field tests some trees received 600 pounds per acre (a level far in excess of the recommended rate).

After treatment, she assessed disease severity in fertilized groups compared with unfertilized checks. First she looked for leaf chlorosis and necrosis. Then she cut open tree trunks and branches and checked for vascular discoloration. The Verticillium fungus lives in vascular tissue and is spread by sap. The amount of discoloration is a measure of disease severity.

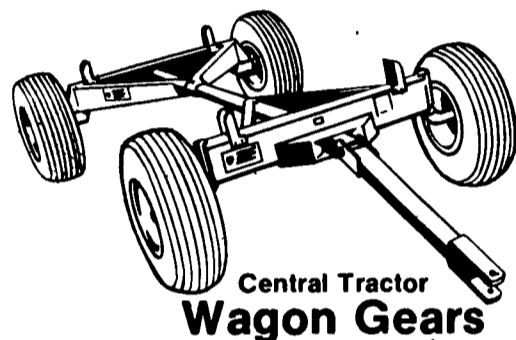
Sanford found greater vascular discoloration in trees which had received a nitrate form of

nitrogen, indicating the wilt pathogen had spread further than when ammonia fertilizer was used. This bears out what other researchers have found. However, using ammonia nitrogen also spread the disease to some extent — much more than in trees which had received no fertilizer at all.

Based on these results, Sanford concludes that, contrary to some recommendations, it is wise to withhold fertilizer entirely from trees which are suspected of having Verticillium wilt.

"I think the tree has a better chance of recovery if left alone," she says. "I would give it water during dry periods because of fungus reduces the capacity of the tree to take up water. But although it's recommended, I don't think fertilizing yellow-poplars is a good idea, even with the ammonium form of nitrogen."

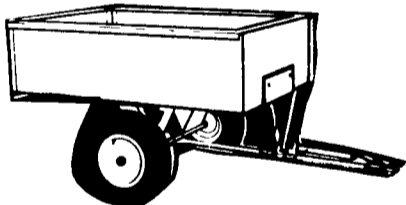
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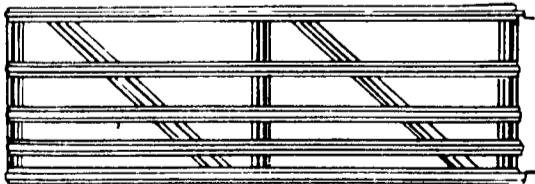


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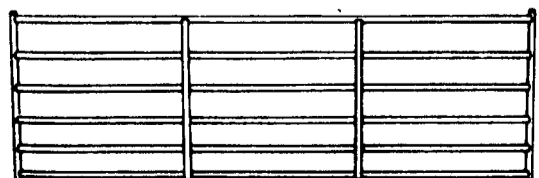
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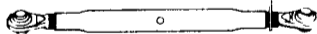
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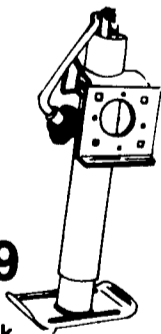
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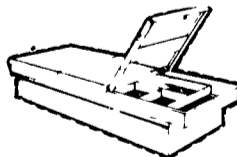
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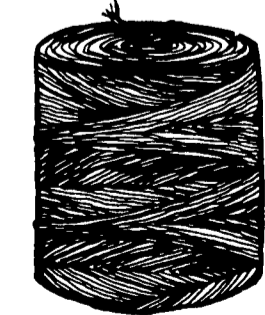
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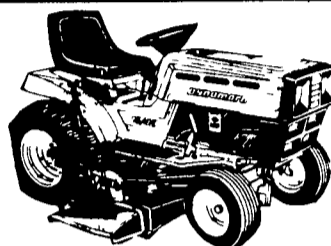


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