TRUNK AND SOIL CHLOROSIS TREATMENTS OF PIN OAK

by Dan Neely

When chlorophyll pigment production is adequate, plant leaves normally are green. When chlorophyll production is inadequate, the yellow pigments in leaves become evident and leaves are called chlorotic. In pin oak, *Quercus palustris,* chlorosis is most often due to a deficiency or lack of availability of iron in the soil or plant. There is a yellowing of tissues between the leaf veins while the veins remain green. Yellowing is evident on young leaves in the spring, and new foliage formed later in the season becomes increasingly chlorotic. As the disease becomes more severe, leaf necrosis, twig dieback, and tree death occur.

Pin oak chlorosis can be corrected by trunk implant (1, 2) and soil (3) treatments. In this study the intensity of response and the longevity of treatments were compared.

Materials and Methods

The pin oak trees used in this study were in a landscape planting on the grounds of the Morton Arboretum near Lisle, Illinois, 25 miles west of Chicago. The soil had been disturbed during road construction before the trees were planted. The 24 mildly chlorotic trees were randomly divided into three treatment groups. Average trunk diameter 3 feet above the ground line was 6.6 inches with tree heights of 15-20 feet in 1974.

Eight trees were treated June 20-21, 1974 with trunk implants and eight were treated with soil injection. Ferric ammonium citrate (standard *Medicaps,* 18% Fe, Creative Sales, Fremont, Nebraska) was placed in ½-inch diameter, 1 3/8-inch deep holes drilled into the trunk every 3 inches around the tree circumference. Chelated iron (Sequestrene Fe 138, CIBA Geigy, Greensboro, North Carolina), 2 lbs/35 gallons water/200 sq ft/tree was injected into soil with a hydraulic pump and a tree feeding needle. Eight trees remained untreated as controls.

On May 3, 1977 the implant-treated trees and the untreated trees received ferric ammonium citrate implants. Eight trees randomly selected from the group were treated with standard Medicaps (18% Fe). Eight trees were treated with smaller Medicaps containing 28% Fe in 3/8-inch diameter, 1¼-inch deep holes spaced every 3 inches around the tree circumference. Four additional pin oaks were selected as untreated controls.

Responses to treatment were determined by rating leaf color two or more times during July-September, 1974 through 1978. Rating was on a scale of 1-9; 1-3=necrosis of the leaf blade, 4-6=yellow leaves, 7-9=green leaves. When coloration of the crown was not uniform, two ratings were given to each tree.

Results and Discussion

Trunk implant treatments corrected pin oak chlorosis much faster than did soil treatments. Within 1 month following treatment, implant-treated trees were dark green. Three months were required in 1974 for the soil-treated trees to respond fully. In both treatments, trees that initially were slightly yellow became dark green (Table 1), with the trunk-treated trees somewhat darker the season of treatment. The untreated control trees progressively declined during the season and throughout the test period.

Neither treatment permanently corrected the chlorotic condition, but soil treatments were decidedly longer lasting than trunk implants. Soil treatments corrected pin oak chlorosis for 4-5 years while trunk treatments were effective for 2-3 years (Table 1). Variation in tree response was noted. In each season following treatment the tree color observed was successively less green.

In this test the ferric ammonium citrate with 18% Fe gave a better and more persistent correction than did the 28% material. Additional comparisons are needed.

Conclusions from the test were: 1) lime-induced chlorosis of pin oak was corrected with trunk im-

plantation of ferric ammonium citrate or by soil treatment with the properly formulated chelated iron, 2) trunk-implant treatments gave a faster response but soil treatments lasted longer, 3) no plant injury was observed, 4) there was no need for annual treatments, 5) most trunk-implant wounds healed during the season of treatment, and 6) trunk implants must be closely spaced to obtain uniform correction of chlorosis throughout the crown.

Table 1. Response of pin oaks at the Morton Arboretum, Lisle, Illinois to trunk and soil treatments to correct lime-induced chlorosis. Eight trees per treatment.

	Initial color	*Treatment color ratings*[a]				
Treatment	*6/21/74*	*1974*	*1975*	*1976*	*1977*	*1978*
Trunk A[b]	6.0	8.6	8.0	7.0	8.6	8.2
Trunk B[b]	6.4	—	—	—	8.3	7.3
Soil	6.5	8.3	8.2	7.7	7.2	6.4
Control	6.4	5.8	5.5	4.9	5.3	5.0

[a]Ratings: 1-3=necrosis of leaf blade; 4-6=yellow leaves; 7-9=green leaves.

[b]A=18% Fe; B=28% Fe in ferric ammonium citrate. Trunk implant treatments in 1974 and 1977.

Literature Cited

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ABSTRACT

Funk, Roger. 1979. **Vegetation management.** Weeds Trees & Turf 18(12): 38, 40.

The following discussion on fertilizer absorption and burn is in response to the many requests for fundamental information in these areas. All fertilizers, whether organic or inorganic, will eventually form soluble salts that separate in water to release the nutrient ions. Ions are atoms or groups of atoms that carry either positive or negative charges and are the only form of nutrients that can be absorbed by plant roots. Organic fertilizers release the same nutrient ions found in inorganic fertilizers but the process is generally slower. The same soluble salts or nutrient ions that are absorbed by plant roots can also cause a type of physiological drought called "burn." The degree to which a fertilizer increases the salt concentration of soil solution is measured by the Salt Index — the higher the salt index, the more rapidly the fertilizer releases soluble salts and the higher the "burn potential."