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Chlorosis of red and silver maple

by Elton M. Smith and Cynthia D. Mitchell

Chlorosis or yellowing of foliage is a common symptom of a number of landscape trees due to one or a number of factors. In areas where the soil pH is above 6.5 manyu plants, including numerous Oak species, become deficient in iron as the iron is in a form unavailable to plants. The symptoms of iron deficiency are, typically, yellow foliage with green veins.

The symptoms of iron deficiency closely resemble the symptoms of manganese deficiency which occurs under the same high soil pH conditions. Manganese deficiency is common in Maples especially in Red (Table 2) and Silver in Ohio. In Michigan, manganese deficiency has also been observed in Sugar and Norway Maple (Table 1).

In advanced cases, the tissue between the veins turns brown particularly along the leaf margins. The symptoms are most likely to occur in the youngest or most recently developed foliage since manganese is relatively immobile within the foliage. New growth of Red Maple is likely to be stunted especially late spring or summer growth.

To properly diagnose chlorosis problems of trees and shrubs a soil test and leaf analysis are recommended. The soil test is important, in the case of manganese deficiency, to determine the soil pH while the leaf or tissue analysis accurately reveals the level of most major and minor mineral elements necessary for plant growth. The proper diagnosis must be stressed, prior to treatment, because Maples treated with iron, rather than manganese, will cause the symptoms to become more severe, since iron suppresses manganese uptake due to an iron-manganese antagonism.

Studies during 1975-1976 at Ohio State University have shown that with both Red and Silver Maple manganese will aid in preventing foliage chlorosis. The data in Tables 1 and 2 reveal that trunk implantations of capsules containing manganese sulfate will improve foliage color and increase both total chlorophyll and manganese levels.

Manganese sulfate capsules are in the marketing channels as Mn medicaps containing 28% manganese. As a result of these and other studies during the past several years, several related points should be made.

Treatments to be effective the season of application should be made prior to leaf growth in spring. In other words, implant during the winter months or early spring although implants can be made year round. Complete wound healing generally occurs if treatments are completed early in the season, while

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Table 1 — The effect of limb implantation of manganese sulfate on Red Maple (Acer rubrum) 5 months from treatment April 29, 1975.

	Check	Manganese
Foliage color (1-10)[1]	5.0	9.0
Total chlorophyll (mg/g)[2]	170	226
Manganese content (ppm)[3]	193	499

1—Figures expressed on a 1-10 scale with 10 the darkest green.
2—Figures expressed as mg. total chlorophyll per g. of leaf tissue.
3—Figures expressed as elemental manganese in parts per million.

Table 2 — The effect of limb implantation of manganese sulfate on Silver Maple (Acer saccharinum) 6 months from treatment March 25, 1976.

	Check	Manganese
Foliage color (1-10)[1]	3.0	8.0
Total chlorophyll (mg))g)[2]	163	209
Manganese content (ppm)	69	153

1—Figures expressed on a 1-10 scale with 10 the darkest green.
2—Figures expressed as mg. total chlorophyll per g. of leaf tissue.
3—Figures expressed as elemental manganese in parts per million.

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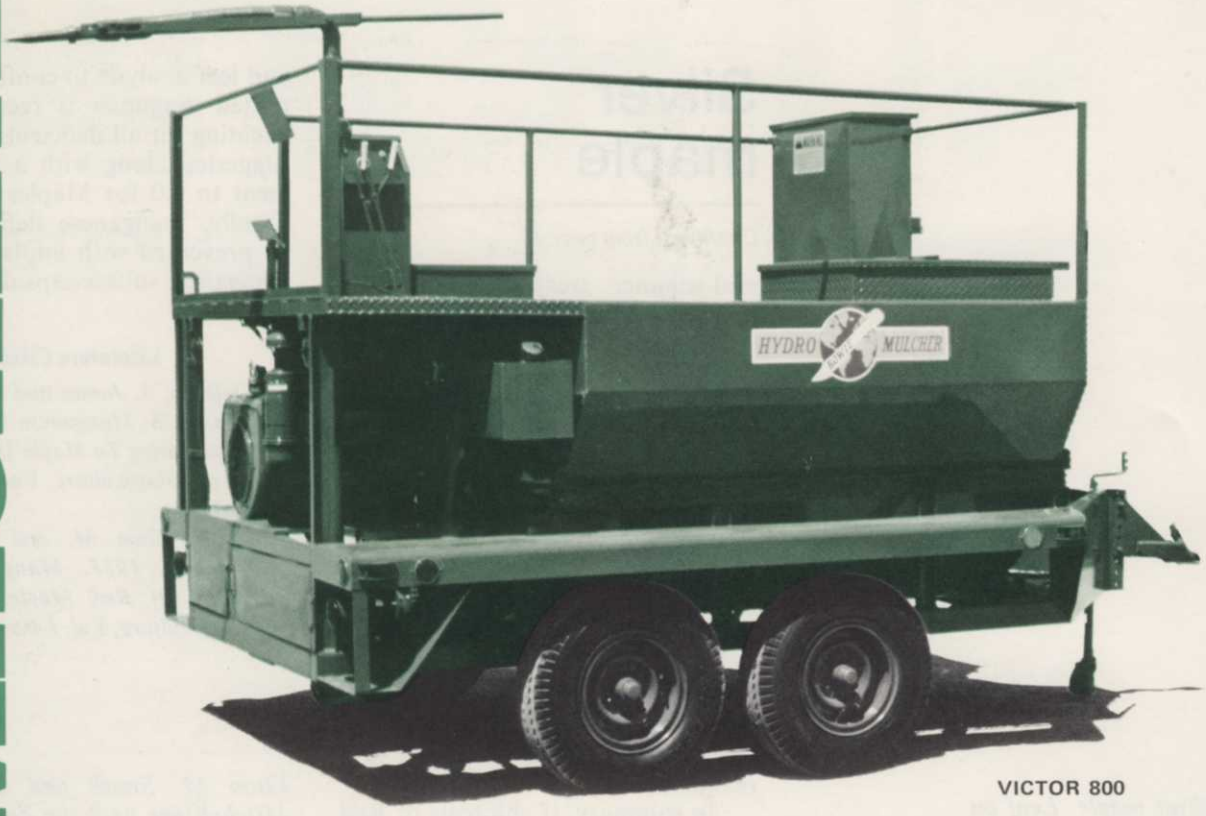

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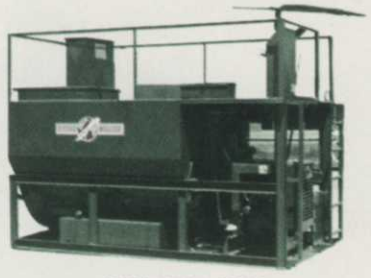

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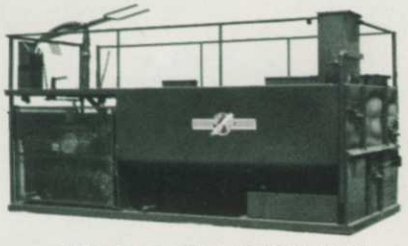

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Silver maple

Continued from page 32

mid-summer treatments may require 12-18 months to close.

Implants of the ½" capsules should be made in a spiral pattern around the base of the tree trunk. Effective control will not be possible unless the head of the capsules are inserted beneath the cambium to allow for proper cambium growth and healing.

Manganese deficiency of Maples can be corrected with other methods of treatment. However, capsule implantation is longer lasting than foliar spraying and more effective than soil treatments particularly in soils with highly alkaline pH readings.

In summary, if chlorosis of Red and Silver Maple is noted with the typical yellowish leaves with green veins the reason is quite likely manganese deficiency. A soil test and leaf analysis to confirm the suspected diagnosis is recommended. Treating for all deficient elements is suggested along with a pH adjustment to 6.0 for Maples is advised. Finally, manganese deficiency can be prevented with implantations of manganese sulfate capsules. □

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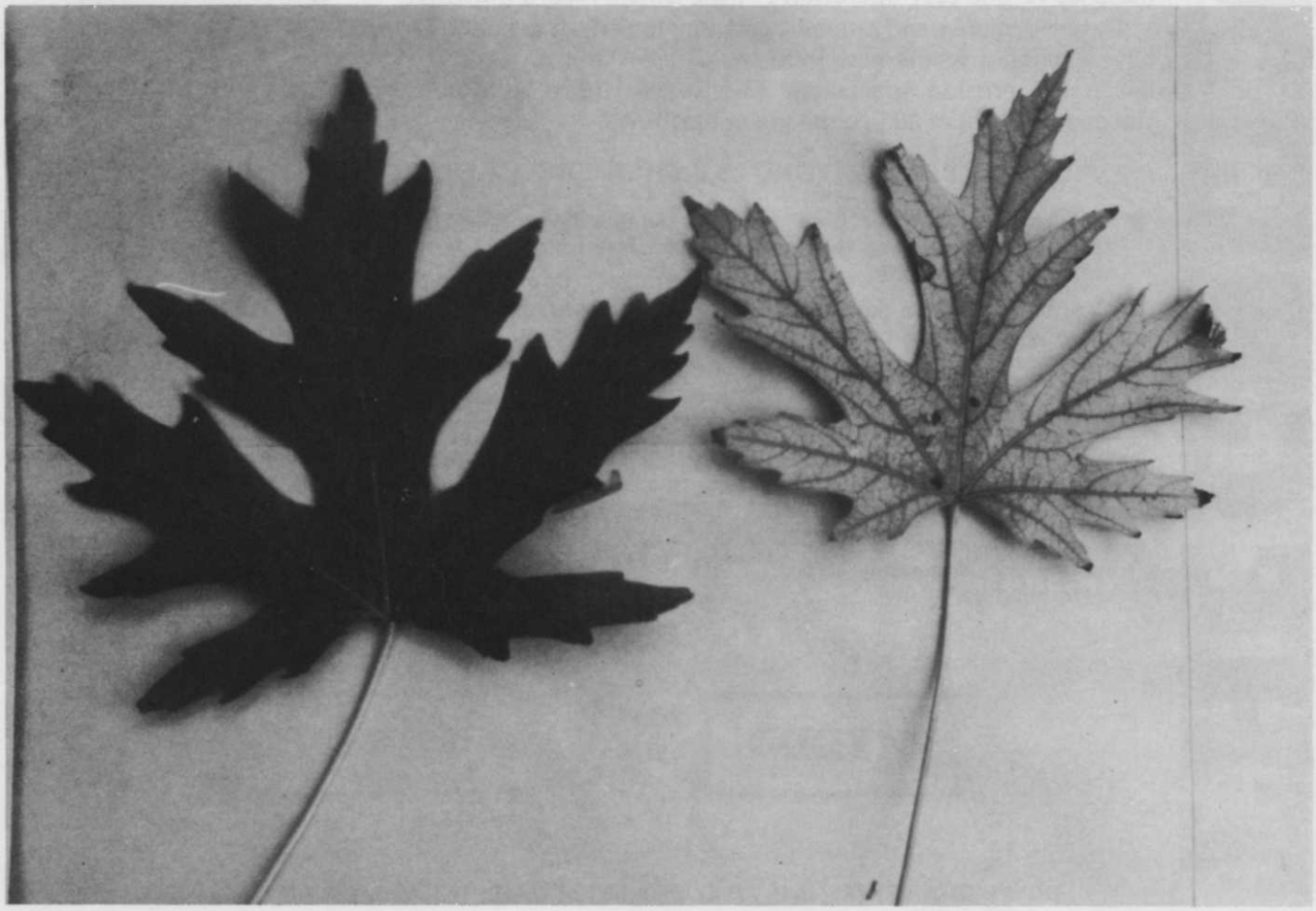
Elton M. Smith and Cynthia D. Mitchell are with the department of horticulture, Ohio State University, Columbus, and the Ohio Agricultural Research and Development Center, Wooster.



Silver maple. Leaf on left treated with MnSO4 capsules in March. Leaf on right untreated. Photo taken in September.

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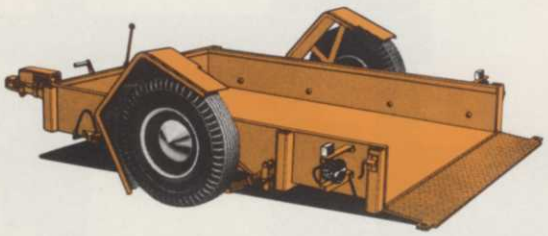

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The greening of Portland International Airport

Final touches were applied to a $405,000 exterior landscaping program in time to dedicate the new Portland International Airport (PIA) on May 16.

The redesigned and expanded PIA — six years under development and $71.8 million later — is a reflection of the casual and friendly Oregon lifestyle.

The landscaping project for the Port of Portland, the municipal corporation which owns and operates PIA, was completed by the Salem, Oregon contracting firm of L & R Landscape, Inc. William K. Roth, Portland landscape architect, served as consultant.

Landscaping around the newly expanded terminal involved planting 54,800 English plants for ground cover, 744 trees and 2,653 shrubs in areas encompassing 275,000 square feet, plus another 350,000 square feet of grass area.

The end product of this new landscaping in Oregon is, in the opinion of Dennis Roberts, PIA general maintenance supervisor, "probably the cleanest and greenest major airport in the country."

Shrub plantings at public approaches to the terminal included 1,341 rose bushes in four varieties to express Portland's legend of being the "City of Roses." In bloom this summer were 1,279 rosa floribunda, 25 European floribunda, 20 Elizabeth of Gaines floribunda and 17 Spanish sun roses.

The spring-summer color bloom also included 1,148 pearl Bradford azaleas.

Nursery-stock trees which were

Continued on page 40

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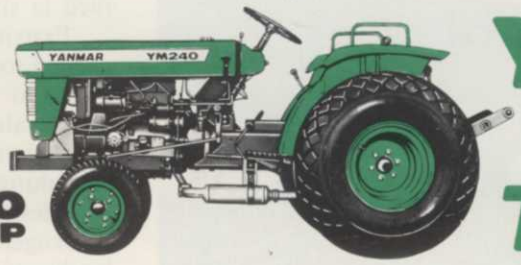

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Portland International

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from 8 to 20 feet high when planted consisted of 401 Scotch pines, 104 thornless honey locust, 98 red maple, 87 shore pines, 73 Washington hawthorn, 45 flame ash and 34 purple leaf plum.

Irrigation for the plantings and lawns is provided by an automatically timed-by-zone sprinkler system with a network of an estimated 12 miles of Schedule 40 PVC pipe in diameter ranging from four-inch mains down to half-inch risers.

Initial landscape grading during new roadway construction to approach the Portland air terminal began five years ago. Landscape soil was riverbottom dredged sand, placed within six inches of the final grade.

Roberts said these soil preparation procedures followed: "We applied 50 pounds of gypsum per 1,000 square feet. Then we applied triple-16 slow-release fertilizer at the rate of 20 pounds per 1,000 square feet. (We are still using 10 tons a year of triple-16 at the airport.) Then we added eight inches of bark dust, plentiful in Oregon, and rotovated the dust into the soil from a minimum 5 inches to a maximum 13 inches. Then we raked to a finished grade.

"Grass was hydroseeded for a quick start and sprayed with a mixture of mulch for faster germination."

The lawn seed mixture by weight consisted of chewings fescue, 35 percent; Illahee creeping fescue, 30 percent; red creeping fescue, 25 percent; and Astoria bentgrass, 10 percent. Roberts said this mixture was determined to be favorable for soil and climate conditions at the airport.

Young trees are among 744 planted along approaches to the newly expanded passenger terminal at Portland International Airport.

New trees are being fed with Jobe tree spikes with 16-8-8 fertilizer, Roberts noted. These one-inch-diameter by six-inch-long spikes are placed at the base of a tree at the rate of one spike for every one-inch in tree-trunk diameter.

In addition to the newly landscaped areas of 625,000 square feet around the PIA terminal, another 2,000 acres of grass between and around aircraft runways are mowed by three men from the general maintenance crew. This outlying turf doesn't need to be as pretty, but specifications still apply.

Maximum growth along runways, for example, cannot exceed 12 inches. Roberts said he uses a 2-4-5-T weed killer along fences, as well as Simazine Precip 80-W ground sterilizer along fence lines and around runway and taxiway light fixtures.

A crew of four full-time men, aided by four students during the summer months, maintains the landscape in public areas around the air terminal. "Grass mowing is a constant job from April to November," Roberts said.

Equipment for the landscape crew includes three large tractors (a pair of 40-20 John Deeres and a Ford 8000) and a Ford 4000 to pull smaller mowers.

The John Deere tractors pull 25-foot wide Terrain King rotary mowers which fold into a 10-foot section for roadway transport. The crew also operates an 8-foot Mott flail-type mower; attached to each side of it is a self-propelled, high-speed Mott to produce a total width of 16 feet. Uses of this rig include trimming around runway and taxiway lights.

The PIA exterior landscaping contract was in addition to the $17.7 million spent over the past three years to expand the airport terminal building, which was nearly doubled in size to 446,150 square feet.

Expansion of PIA facilities was needed to serve swelling numbers of Portland air travelers using eight major airlines. The terminal was first opened in 1958 on its present site along the Columbia River and was designed to handle 1.5 million passengers a year. PIA passenger loadings in 1976 hit a record 3.3 million, far more than the state's entire population of 2.4 million. □