



Typical manganese chlorosis of red maple.

Several chlorotic cultivars of Red Maple growing in a commercial nursery in a silt loam soil in central Ohio were sprayed twice (1 month apart) with chelated manganese in late summer to reduce the severity of the chlorosis. Definite regreening did take place. It was indicated by the increased total chlorophyll level of foliage of all trees sprayed. The recommended rate is 2 tablespoons of chelated manganese per gallon of water of disodium manganous ethylenediamine tetracetate dihydrate (sold as Sequestrene  $\text{Na}_2\text{Mn}$ ).

**TABLE 2.** The Chlorophyll Content of the Foliage of Red Maple Cultivars as a Function of Spraying

with Chelated Manganese 3 and 7 Weeks Previous to Sampling on September 17, 1975.

Cultivar	Total chlorophyll content*	
	Check	Chelated manganese
<i>Acer rubrum</i>	194.20	226.09
<i>Acer rubrum</i> (Red Sunset)	160.15	242.03
<i>Acer rubrum</i> 'October Glory'	215.95	228.99
<i>Acer rubrum</i> 'Bowhall'	205.80	216.67
<i>Acer rubrum</i> 'Armstrong'	224.64	227.54
<i>Acer rubrum</i> 'Autumn Flame'	197.10	218.12
Average	199.64	226.57

\*Total chlorophyll content—Figures expressed as mg. total chlorophyll per g. of leaf tissue.

In conclusion, if chlorosis of maples (particularly Red Maple) is observed with typical green veination, the cause is quite likely manganese deficiency. The soil should be tested and pH lowered if possible to a slightly acid range (6.0-6.5) for most permanent results. A foliar analysis will determine which mineral element(s) is causing the problem. In some cases, perhaps only a pH adjustment is necessary to control the chlorosis. In other instances, both pH adjustment and trunk implantation (foliar or soil) treatment with a manganese compound will be necessary.

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## ABSTRACT

Elias, T.S. and H.S. Irwin. **Urban trees.** *Scientific American* 235(5): 111-118.

How can trees survive in an urban environment? The human artifacts we call cities first appeared less than 10,000 years ago. The ancestors of today's trees are some 20,000 times older than the oldest cities. In view of the fact that trees have been exposed to more than 100 million years of selective pressure to adapt to natural environments, it borders on the biologically miraculous that any tree can occupy an environmental niche as hostile as a city street. The fact that urban trees manage to survive is certainly not the result of rapid evolutionary adaptations to the city's hostile environment. Neither the 200 years that have seen the rise of the industrial metropolis nor the 100 centuries of coexistence between trees and city of any kind is a period long enough to have let selective pressures sort out the genes needed to give rise to a city-proof trees. It is man's intervention, not nature's, that has kept trees in the city. A good demonstration of this fact, on which we shall concentrate here, is the succession of street trees in the northeastern U.S. over the past 200 years.