

TRACE ELEMENTS FOR MASSACHUSETTS CORN

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In an attempt to evaluate the need for trace element fertilization of corn in Massachusetts we measured boron, copper, iron, manganese and zinc concentrations in leaves of a corn hybrid and 'available' copper, iron, manganese and zinc in soils from 35 dairy farms located across Massachusetts. Leaf and soil samples were collected from four locations on each farm.

Analysis of the leaves (Table 1) showed that concentrations of boron, copper and iron were adequate in all samples. Manganese was 'low' in 20 per cent of the samples and zinc was low in 29 per cent and deficient in 3 per cent of the samples, indicating that corn growth on some soils might be improved by manganese or zinc fertilization.

Table 1. Percentage of corn leaf samples in different nutritional status categories as indicated by the concentration of trace elements in the ear leaf at flowering.

Element	Deficient	Low	Adequate	High	Excess
	per cent of samples				
Boron	0	0	100	0	0
Copper	0	0	100	0	0
Iron	0	0	100	0	0
Manganese	0	20	80	0	0
Zinc	3	29	68	0	0

A reliable soil test for trace elements would identify those soils in which corn growth could be improved by application of a fertilizer containing a trace element. 'Available' copper, iron, manganese and zinc extracted from the soils, using the 'DTPA' soil test was compared with the concentration of the element in the corn leaves. The results were disappointing. Leaf iron was not related to soil test iron. Although amounts of copper, manganese and zinc in the leaves were related to the amounts 'available' in the soil according to the soil test, the relation was poor. Differences in soil test levels accounted for only 10, 27 and 5 per cent of the variation in leaf copper, manganese and zinc respectively. The results indicate that other soil properties, such as soil pH, must be taken into account in order to predict the need for trace element fertilization.