Table 1. *Micronutrient application rates (lb element/acre)**

Soil Class	Banded		Broadcast			Foliar Spray		
	Mn	Zn	Mn	Zn	Cu	Mn	Zn	Cu
Mineral (MIN)	3	3	10	6	2	0.5	0.5	0.25
Mineral-Organic (M-O)	3	3	10	6	4	0.5	0.5	0.25
Organic (ORG)	3	3	10	6	6	0.5	0.5	0.25

* If a soil test recommends application of a micronutrient, a source must be chosen. Under the soil and climatic conditions in North Carolina, sulfates of the particular element and liquids formulated with ammonia, chlorides and nitrates are the most effective. Chelates and organic complexes used at equivalent elemental rates listed above are effective, but quite expensive. Oxides and most oxysulfates, except under special conditions, are not as effective. Be sure to confirm the compatibility of micronutrient source products with any other chemicals before mixing.

Premium fertilizers, which contain an array of micronutrients in very small quantities, may not correct a deficiency.

Additional information can be obtained from an NCDA&CS regional agronomist or the local Cooperative Extension office.

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$ NOTE: Secondary Nutrients & Micronutrients

This note gives advice for managing the actual or potential deficiency of copper, magnesium, manganese or zinc, which is indicated on your soil report by the *$* symbol in the appropriate column. This note also addresses the management of potentially toxic levels of copper and zinc. Recommendation codes for each of these elements are explained below.

Magnesium (Mg) Recommendation

0 Additional Mg is not needed.

25 If lime is recommended, use dolomitic lime, which contains a minimum of 120 lb Mg per ton.

If no lime is needed, add 20–30 lb/acre of readily soluble Mg to your fertilizer. An excellent fertilizer is 0-0-22 (11.5%); rates of 175 to 250 lb/acre of 0-0-22 alone or in a fertilizer blend will usually satisfy crop needs. Annual applications of Mg may be required until a subsequent soil test shows an adequate level in the soil.

$ If a Mg rate is given for *1st Crop*, then a *$* sign in the **Mg** column for *2nd Crop* indicates that Mg still may be needed.

Copper (Cu) Recommendation

0 Additional Cu is not needed.

Any number other than 0 — This number is a suggested broadcast application rate for Cu, expressed in lb/acre. A recommendation is given if the Cu index is low (*Cu-I* <25), and the crop will

respond to Cu fertilization. Application should correct the deficiency for several years. Incorporate broadcast applications into the plow layer for maximum benefit. Foliar application is effective if the Cu deficiency occurs during the growing season, as determined by tissue testing.

$ Monitor Cu levels. *Cu-I* is low (< 25), but the indicated crop may not respond to fertilization. If a rate is given for *1st Crop*, a *$* sign in the **Cu** column for *2nd Crop* indicates Cu may still be needed ***if it was not applied to the first crop***.

C The *Cu-I* is greater than 2000. The critical toxic level is 3000. See comments printed on the soil report for further advice.

Zinc (Zn) Recommendation

0 Additional Zn is not needed.

Any number other than 0 — This number is a suggested broadcast application rate for Zn, expressed in lb/acre. A recommendation is given if the Zn-availability index is low (*Zn-AI* <25), and the crop indicated will respond to Zn. Application should correct the deficiency for several years.

$ Monitor Zn levels in the crop. *Zn-AI* is low (<25), but the crop indicated may not respond to fertilization. If a rate is given for *1st Crop*, a *$* sign in the **Zn** column for *2nd Crop* indicates that Zn may still be needed ***if it was not applied to the first crop***.

Z The *Zn-I* is greater than 2000. The critical toxic level is 3000. See comments printed on the soil report for further advice.

Peanuts are very sensitive to zinc, and toxicity may occur at soil levels well below 2000. The risk of toxicity is greater with low soil pH and may occur at *Zn-AI* values as low as 300. The critical toxic level for peanuts has been set at 500.

Zn-AI is an availability index related to soil class. *Zn-AI* will be greater than the *Zn-I* for mineral-organic (M-O) and organic (ORG) soils due to a lower target pH for these soil classes.

When Zn deficiencies occur due to high pH and phosphorus levels, a foliar application of Zn is required. The decision to apply Zn in this manner should be based on results of a current soil test and plant tissue analysis. Although some lime contains Zn, lime is not a sufficient source of Zn if soil test levels are low.

Manganese (Mn) Recommendation

0 Additional Mn is not needed.

10 Apply Mn at the rate of 10 lb/acre broadcast. The Mn-availability index is low (*Mn-AI* <25), and the indicated crop is responsive to Mn application.

$ Monitor your crop closely for Mn problems. In this case, the *Mn-AI* is <25, but the crop indicated may not respond to Mn. Plant tissue analysis is a good way to track Mn levels in the crop. If tissue levels are low, application of foliar Mn may be warranted.

$pH There is an existing or potential Mn deficiency due to *pH* >6.2 and *Mn-AI* <25. These recommendations can correct or prevent this problem:

• For currently growing crops, apply a totally water-soluble source of Mn to the foliage. Depending on the severity of the deficiency and the crops's stage of growth, a second application may be required 7 to 10 days later.

• Under preplant conditions and with *Mn-I* >25, band acid-forming starter fertilizers that do not contain Mn. If *Mn-I* <25, use an acid-forming starter fertilizer containing Mn.

• If *pH* >6.2, do not soil-broadcast a Mn fertilizer. If overliming is the principal cause of Mn deficiency, apply acid-forming fertilizers or till deeply to lower the soil pH. Foliar applications and/or acid-banded treatments are remedial and may be required for each crop until the *pH* falls below 6.2.

pH$ Mn levels are high (Mn-AI >25), but there is potential for deficiency since soil pH is also high (>6.4). Use a foliar spray of Mn to correct a deficiency if symptoms become apparent.

Mn deficiency is common on coastal plain soils (particularly in small grains and soybeans) and less frequent in the rest of the state. Overliming (*pH* >6.2) or inherently low levels of soil Mn are normal causes.

Mn availability is influenced by soil pH. As pH increases, Mn availability decreases. Some crops show Mn deficiency more readily than others.

On the soil report, three values relate to Mn levels: *Mn-I*, an index correlated to the actual amount of Mn in the soil; *Mn-AI(1)*, the Mn-availability index for the first crop; and *Mn-AI(2)*, the Mn-availability index for the second crop.