

Table 1. Soluble-salt hazards based on soil media type

Media Type	Soluble-Salt Index (SS-I) Ranges			
	Low	Medium	High	Very High
peat-lite mixes	0-40	41-100	101-180	180+
silt-clay loam	0-30	31-75	76-135	135+
sandy loam	0-23	24-51	52-95	95+
pine bark	0-12	13-26	27-50	50+

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

**North Carolina
Department of Agriculture**

**Agronomic Division
4300 Reedy Creek Road
Raleigh, NC 27607-6465**



Revised 3/97

2,500 copies of this public document were printed
at a cost of \$175.93 or \$0.07 per copy.

**NOTE 8:
Greenhouse Tomatoes**



Lime

A high calcium level in the soil is essential for optimum growth of tomatoes and prevents blossom-end rot. The lime rate recommended on your soil test report should raise the soil pH to around 6.5 and maintain a high level of calcium.

The desired calcium level for greenhouse tomatoes ranges from 55 to 60%. If no lime is recommended and calcium is below 55%, broadcast 8–10 lb of gypsum per 1000 ft². Lime and gypsum applications are most effective when incorporated into the soil prior to transplanting.

When magnesium is low, \$ appears in the Mg column of the *Recommendations* section of the soil test report. If \$ is present and lime is recommended, apply dolomitic lime. Otherwise, apply 10 lb of Epsom salts per 1000 ft².

High rates of potassium and ammonium nitrogen can interfere with magnesium uptake even when soil magnesium levels appear adequate. If magnesium deficiency symptoms appear, spray plants with 1.0 lb of Epsom salts in 10 gallons of water. Spray enough to cause run off.

Preplant Fertilization

Broadcast and incorporate 2 lb nitrogen per 1000 ft² and all the recommended P₂O₅ and K₂O.

It can be detrimental to apply more nitrogen and potassium than recommended. High soluble salts burn seedlings. Excess nitrogen delays fruit set. If either of these situations occurs, cease fertilizer application and maintain adequate soil moisture.

When plants begin to bloom, use plant tissue analysis to determine the need for fertilizer supplements. Follow the guidelines outlined in the next section.

Supplemental Fertilization

Four weeks after transplanting and at 4-week intervals thereafter, sidedress with 0.75 lb N and 1.0 lb K₂O/1000 ft². Continue sidedressing until plants top out or set the last fruit cluster. Spread sidedressed fertilizers in a broad band at least 4–6 inches away from plants and water into the soil.

The following materials supply 0.75 lb nitrogen and/or 1.0 lb K₂O/1000 ft²:

- 1.5 lb ammonium nitrate (33.5-0-0) & 2.3 lb potassium nitrate (13-0-44) [supplies N & K₂O],
- 2.2 lb ammonium nitrate (33.5-0-0) [supplies N only],
- 2.0 lb potassium sulfate (50% K₂O) [supplies K₂O only],
- 3.0 lb calcium nitrate (15.5% N) & 2.3 lb potassium nitrate (13-0-44) [supplies N, K₂O & Ca].

Monitor the crop's need for supplemental fertilizer by taking timely soil and plant tissue samples. Begin taking weekly plant tissue samples at first bloom and continue until plants top out. Take soil samples at monthly intervals and at least 8 days before the monthly scheduled fertilizer application. Soil monitoring assesses the need for the scheduled fertilizer application and indicates any potential soluble-salt buildup.

If monitoring indicates adequate nutrient levels and no immediate need for fertilizer, alter your schedule to sidedress at 5-week, instead of 4-week, intervals. Too much fertilizer causes soluble-salt buildup and increases the potential of blossom-end rot. Excessive nitrogen, in particular, promotes vegetative growth at the expense of fruit set.

Blossom-End Rot

This tomato fruit problem can be caused by high soluble salts, low soil calcium or inadequate soil moisture. When it occurs, remove the affected fruit and spray the remaining fruit with a solution of calcium chloride at the rate of 2 to 4 level tablespoons per gallon of water. Direct the spray toward the fruit.

Repeat this treatment at 7- to 10-day intervals for at least two or three applications. Make sure soil moisture is adequate.

Plant Tissue Sampling

Take soil and plant tissue samples from at least ten plants within each unit or bay. Collect the fifth leaf down from the growing tip. From each tissue-sampled plant, take a core of soil from the root zone.

Label the matching soil and plant tissue samples with identical numbers or letters. Fill out the information sheet in detail, specifying fertilizer treatments, stage of plant growth, etc. Boxes, envelopes and information sheets for soil and plant samples are available through local agricultural advisors or the NCDA&CS Agronomic Division.

Micronutrients (B, Mn, Zn & Cu)

Boron is essential for fruit set and quality. Apply 6 oz of borax (11% B) per 1000 ft² along with the preplant fertilizer treatment. Take care not to exceed this rate because too much boron is detrimental to plants.

On the soil test report, a \$ in a micronutrient column of the *Recommendations* section indicates that soil levels of that nutrient are low. When this is the case, apply the indicated amount of the appropriate nutrient for each 1000 ft²:

Mn	13 oz manganese sulfate (28% Mn)
Zn	6 oz zinc sulfate (36% Zn)
Cu	6.4 oz copper sulfate (25% Cu)

Use trace element materials that are totally water soluble and easily incorporated into the soil.

Soluble-Salt Index (SS-I)

The rate of fertilizer, type of growth media, weight-to-volume ratio (W/V), cation exchange capacity (CEC), water-holding capacity and temperature all influence the soluble-salt index. The rate of fertilizer has the greatest effect and is directly correlated with levels of soluble salts.

Plants grown in an artificial media, such as peat-vermiculite mixes, require and will tolerate a much higher salt index than those grown in mineral soils. This is because artificial soils have a higher water-holding capacity.

Therefore, interpreting the soluble-salt index depends on soil type. Table 1 shows how one SS-I value can have different implications for different media. Based on the soluble-salt levels shown in the table, take the appropriate action indicated below.

Soluble-salt Level	Action Required
Low	The media needs additional fertilizer. The effect of salt on the plants is negligible.
Medium	Fertilize plants only if the SS-I is at the low end of the range.
High	Germination and seedling injury may occur if the SS-I is at the high end of the range. Otherwise, levels are satisfactory.
Very High	Do not add fertilizer or let the media become dry. Water enough to cause leaching if the SS-I is at the high end of the range. Leach extensively if it is over this range.