

## Peppers

### Management Highlights

- Target pH: 6.5
- Split N applications to increase N use-efficiency in peppers. Apply 50 lbs N/ac at or prior to planting and the remainder in two sidedress applications -- the first following first fruit-set and the second later as needed.
- Apply 1 lb actual B/ac if soil test B is "Low" (0.7 lbs soil test B/ac or less).

### Yield Goals

Yield of peppers is influenced by many factors beyond soil test results and fertilizer application. Cultivar selection, planting date, weather conditions, soil type and water-holding capacity, weed, insect and disease pressure and crop management practices are just a few. *For that reason, the University of Delaware does not use yield goals in determining nutrient recommendations for vegetable crops at the present time. Instead, recommended rates are designed to produce maximum economic yields of high market quality in a good to average year.*

Growers should use these nutrient recommendations along with field history data, their knowledge of specific crop requirements, their management plans, and conditions from the current growing season to develop an appropriate fertilizer program for the crop.

### Soil pH and Liming

The target pH for peppers on most Delaware soils is 6.5. Soils that are higher in organic matter ("black" soils) have a lower target pH (5.6) because organic matter moderates some of the effects of excessive soil acidity (e.g., aluminum toxicity). The lime recommendation for a specific field is calculated from the soil pH and buffer pH measurements using the steps outlined in *Calculating the Lime Requirement – Chapter 3, Section 3.4*. Avoid

overliming in order to prevent deficiency of micro-nutrients such as manganese.

In most cases, the lime requirement can be met by either calcitic or dolomitic limestone. When soil test Mg is less than 38 FIVs, use dolomitic limestone to prevent Mg deficiency and increase soil Mg concentrations.

### Nitrogen Management

The University of Delaware recommendations for rate, method and timing of nitrogen (N) application for pepper production is dependent upon the cultural practices being used. In all cases, fertilizer N rates should be reduced when planting into legume cover crops or when manure has been applied. To calculate the adjustment, see *Nitrogen Rate Adjustments – Chapter 3, Section 3.5.1.2*.

### Traditional Culture

In traditional culture, a total N rate of **100-130 lbs N/ac** is recommended per growing season. The N should be split into 3 treatments and applied according to the schedule in Table 1, below.

**Table 1. Nitrogen recommendations for pepper production using traditional culture.**

Application Time	Application Method	N Rate (lbs N /ac)
At or prior to planting	Broadcast and disk in	50
After first fruit set	Sidedressed	50
Later in season, if needed	Sidedressed	25 - 30

### Plastic Mulch

When plastic mulch is used without drip/trickle irrigation, the N rate should be increased to **150 lbs N/ac**. Broadcast all recommended fertilizer (N, P<sub>2</sub>O<sub>5</sub>

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and K<sub>2</sub>O) and disk in prior to mulch installation and planting.

### Drip / Trickle Fertilization

Prior to mulch installation, apply **50 lbs/ac N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O** and incorporate thoroughly into the soil. Install the drip/trickle irrigation lines and the plastic mulch. **NOTE: If soil test K is 50 FIVs or less, use a fertilizer material with a ratio of 1-1-2 or 1-1-3 at a rate sufficient to supply 50 lbs N/ac.**

Within one week of transplanting peppers, begin applying a complete, soluble fertilizer in the irrigation water at a rate of **30 lbs N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O/ fertilized mulch acre**. Repeat the fertilizer application every 3 weeks during the growing season for a total of 6 applications. For further information on the use of drip/trickle fertilization of peppers, see **Cooperative Bulletin No. 137: Commercial Vegetable Production Recommendations - Delaware 2003** (Kee et al., 2003).

### Phosphorus Management

Yield-limiting phosphorus (P) deficiency is rarely a concern on Delaware soils. Long-term applications of fertilizer and manures have resulted in P accumulations on many soils that are capable of supplying crop needs for several years with no further additions.

To determine whether P fertilization is necessary for a specific field, conduct a routine soil test. University of Delaware P recommendations for peppers are dependent upon the soil test P value and the P requirement of the crop. A summary of those P recommendations is given in Table 2 below.

**Table 2. Phosphorus recommendations for peppers.**

Application Method and Timing	P Index Value			
	0-25	26-50	51-100	101 +
	----- lbs P <sub>2</sub> O <sub>5</sub> / ac -----			
Broadcast and disk in prior to planting	200	150	100	0

### Potassium Management

The need for potassium (K) fertilization of peppers is best determined by a routine soil test. Potassium recommendations are based on the soil test K value and the K requirement of the crop. A summary of University of Delaware K rates for peppers is given in Table 3.

**Table 3. Potassium recommendations for peppers.**

Application Method and Timing	K Index Value			
	0-25	26-50	51-100	101 +
	----- lbs K <sub>2</sub> O / ac -----			
Broadcast and disk in at or prior to planting	200	150	100	0

### Calcium and Magnesium Management

Calcium (Ca) and magnesium (Mg) needs of peppers are usually met through routine liming. If the soil test Mg value is low (e.g., less than 38 FIVs) and liming is indicated, use dolomitic limestone to raise soil pH and increase soil Mg. If, however, liming is not necessary but Mg fertilization is still indicated, apply soluble Mg as Mg sulfate or Mg chloride to increase soil Mg. Appropriate application rates are given below in Table 4.

**Table 4. Application rates for soluble Mg as a function of Mg fertility index value.**

Mg Index Value								
0	5	10	15	20	25	30	35	40
----- lbs soluble Mg / ac -----								
80	70	60	50	40	30	20	10	0

### Boron Management

Boron (B) deficiency may occur in peppers grown on Delaware soils. The best way to determine the need for B fertilization is with a soil test. If soil test B is "Low" (0.70 lbs soil test B/ac or less), apply 1 lb/ac of actual B in a blended, broadcast fertilizer or as a soil or foliar spray. If drip/trickle fertilization is being used, soluble B can be applied through the irrigation system at a rate of 0.25 lbs B/fertilized mulch acre with each fertilizer application. *Avoid*

*over-application of B to prevent plant injury from B toxicity.*

**Manganese Management**

Manganese (Mn) deficiency may occur in peppers grown on Delaware soils, most often as a result of overliming soils that are naturally low in Mn. The University of Delaware Soil Testing Program uses an availability index based on the soil test Mn value and soil pH to predict the likelihood of Mn deficiency. That availability index is calculated using the equation:

$$MnAI = 101.7 - (15.2 \times pH) + (2.11 \times ST-Mn)$$

where:

- MNAI = Mn availability index
- pH = water pH of the soil
- ST-Mn = Mehlich 3 soil test Mn in lbs/ac.

Table 3-14 in *Chapter 3, Section 3.5.5.2 (Manganese Management)* gives a summary of MNAI values for various soil pH-soil test Mn combinations. Interpretations of the Mn availability index for peppers are given in Table 5.

**Table 5. Interpretation of the Mn availability index for peppers.**

MnAI Value	Interpretation
Less than 12	Mn deficiency is likely at this soil pH and Mn concentration.
12 or greater	Mn deficiency is unlikely.

Suspected Mn deficiency can be confirmed by tissue analysis. Confirmed deficiency situations can be corrected in season by foliar applications of Mn of 1-2 lbs/ac of actual Mn as Mn sulfate, Mn oxide or Mn chelate. If deficiency is predicted by the availability index or was observed during the previous growing season, it can be prevented by an application of 8-10 lbs/ac of actual Mn in the fertilizer band. Band applications of acid-forming fertilizer, which lower the pH in the area of plant roots, may correct Mn deficiency without the addition of Mn fertilizer.

**Other Nutrients**

No other nutrients are known to be limiting to pepper production in Delaware.

**Additional Information**

See Soil Test Notes 1, 4,5 and 7 (Appendix 7) and **Extension Bulletin 137 *Commercial Vegetable Production Recommendations - Delaware 2003*** (Kee et al., 2003) for additional information concerning nutrient management of peppers.