

## Lima beans

### Management Highlights

- Target pH: 6.2
- For most efficient use of N, broadcast prior to planting or sidedress at or prior to bloom.

### Yield Goals

Yield of lima beans is influenced by many factors beyond soil test results and fertilizer application. Cultivar selection, planting date, early vegetative growth, 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 recommendation along with field history data, their knowledge of specific crop requirements, appropriate management practices, and conditions from the current growing season to develop an appropriate fertilizer program for the crop.

### Soil pH and Liming

The target pH for lima beans on most Delaware soils is 6.2. 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 micronutrients 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 recommends a total nitrogen (N) application of **60 - 80 lbs N/ac** per growing season for single cropped lima beans. The total rate should be split into two treatments and applied according to the schedule in Table 1.

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*.

Table 1. Nitrogen recommendations for broccoli.

Application Time	Application Method	N Rate (lbs N /ac)
At planting	Broadcast and disk in	30 - 40
	<i>OR</i> band place with the planter	30
3-5 weeks after emergence	Sidedressed	30-40

### Phosphorus Management

Yield-limiting phosphorus (P) deficiency is rarely a concern on Delaware soils. Long-term applications of fertilizers 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 lima beans 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 lima beans.**

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	100	60	20	0
<i>OR</i>				
Band place with the planter	50	30	10	0

**Potassium Management**

The need for potassium (K) fertilization of lima beans 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 lima beans is given in Table 3.

**Table 3. Potassium recommendations for lima beans.**

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 prior to planting	140	100	60	0
<i>OR</i>				
Band place with the planter	30	15	0	0

**Calcium and Magnesium Management**

Calcium (Ca) and magnesium (Mg) needs of lima beans 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

**Manganese Management**

Manganese (Mn) deficiency may occur in lima beans 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 lima beans are given below in Table 4.

**Table 4. Interpretation of the Mn availability index for lima beans.**

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

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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 lima bean 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 lima beans.