



Fertilizer and Lime Recommendations for Cowpeas in Oklahoma

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Nitrogen (N) Requirement: Cowpea, like all legumes, forms a symbiotic relationship with a specific soil bacterium (*Rhizobium* spp.). *Rhizobium* makes atmosphere free nitrogen (N) available to the plant by a process called nitrogen fixation. Fixations occur in root nodules of the plant and this will reduce the need for N fertilizers. Generally, seed inoculation with *Rhizobium* specific to cowpea is needed to maximize N fixation. Too much N promotes lush vegetative growth. This may result in delayed maturity, reduced seed yield and suppressed N fixation. A starter N rate of 10-20 lbs/acre is all that is needed for early plant development. This starter N can be applied with phosphorous (P) and potassium (K) fertilizers.

Phosphorus and Potassium Recommendations for cowpeas are shown in Table 1 and 2. Both P and K fertilizers should be applied at planting.

Table 1. Phosphorus requirement for cowpea production in Oklahoma using Mehlich 3 extraction.

P Soil Test Index	Percent Sufficiency	P ₂ O ₅ (lbs/A)
0	40	70
10	60	50
20	80	30
40	95	20
65+	100	0

Table 2. Potassium requirement for cowpea production in Oklahoma using Mehlich 3 extraction.

K Soil Test Index	Percent Sufficiency	K ₂ O (lbs/A)
0	50	80
75	60	60
125	80	45
200	90	30
250+	100	0

Sulfur and Other Nutrient Requirements: Generally, secondary and micronutrients are adequate in Oklahoma for cowpea production, but a soil test will ensure the adequacy of those nutrients.

Lime Recommendation (Table 3) for cowpeas is based on the pH and the buffer index of the soil sample.

Table 3. Lime rates for cowpea production in Oklahoma. No lime is recommended when soil pH is 5.5 and higher no matter what the buffer index is.

Soil Buffer Index	ECCE* Lime (tons/A)
6.2	4.2
6.3	3.7
6.4	3.1
6.5	2.5
6.6	1.9
6.7	1.4
6.8	1.2
6.9	1.0
7.0	0.7
7.1	0.5
7.2+	0.0

*Effective Calcium Carbonate Equivalent - Pure calcium carbonate ground fine enough to be 100% effective. The rate of ag-lime to apply can be determined from the ECCE requirement using the following formula:

$$\text{Tons of ag-lime / A} = \text{Tons ECCE lime required / \%ECCE}$$

References:

- Zhang, et al. 1998. OSU Soil Test Interpretation. OSU Extension Facts F-2225.

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