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Fertilizer and Lime Recommendations for Canola in Oklahoma

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Canola is a relative new crop to Oklahoma, therefore, few field studies have been conducted in the state to evaluate its nutrient needs and pH suitability. Research conducted in other states and other countries suggests that nutrient needs of Canola are similar to those of small grains except that canola requires slightly higher soil pH, more nitrogen and more sulfur than winter wheat. This publication highlights the fertilizer and lime recommendations for Canola production in Oklahoma modified from the well established recommendations for small grains. Refer to OSU F-2225 for more complete information on soil test interpretations.

Nitrogen (N) Requirement: The amount of N needed is directly related to the yield goal. Yield goals should be sufficiently greater than long-term average yields to ensure nitrogen will not be the factor limiting crop production during years with better than average growing conditions. As a rule of thumb, the average of the three highest yields from the last five years or a 5-year average plus 20% is an appropriate yield goal. The nitrogen fertilizer rate is calculated by subtracting the soil test N value from the nitrogen requirement for a yield goal listed in Table 1. Excessive preplant N levels may reduce canola's winter hardiness. Therefore, it is recommended to apply 1/3 (or 35 to 50 lbs/A) of the total N preplant and the remaining N as a topdress in the spring.

Total N requirement for canola can be calculated using the following equation if soil is tested:

N (lbs/acre) = 0.05 x yield goal (lbs/A) – soil test N (lbs/A)

Table 1. Nitrogen requirement for winter canola production in Oklahoma. Actual N needed is the amount listed in this table less soil test N.

Yield Goal (lbs/A)	N requirement (lbs/A)
1000	50
1500	75
2000	100
2500	125
3000	150
3500	175

Phosphorus (P) and Potassium (K) Recommendations: are shown in Table 2 and 3. Both P and K fertilizers should be applied in the fall before or at planting. Banding fertilizers (e.g., DAP or KCl) with canola seeds may cause injury to seeds and seedlings if the distance between fertilizer and seeds is inadequate. Do not band apply fertilizers with the seeds if you are not sure whether injury is a problem.

Table 2. Phosphorus requirement for winter canola production in Oklahoma using Mehlich 3 extraction.

P Soil Test Index	Percent Sufficiency	P_2O_5 (lbs/A)
0	25	80
10	45	60
20	80	40
40	90	20
65+	100	0

Table 3. Potassium requirement for winter canola production in Oklahoma using Mehlich 3 extraction.

K Soil Test Index	Percent Sufficiency	K_2O (lbs/A)
0	50	60
75	70	50
125	80	40
200	95	20
250+	100	0

Sulfur Requirement: Sulfur (S) is a mobile nutrient in soils; therefore, plant requirements are based on yield goals similar to that of nitrogen. Sulfur requirements for non-legumes are calculated by dividing the nitrogen requirement by 10. The available S measured by the S soil test for both the surface (0-6") and subsoil (6-18") is subtracted from the requirement to determine S fertilizer rate. The rate may also be reduced by an additional 6 lbs/acre due to S supplied through rainfall and other incidental additions such as N, P, and K fertilizer impurities. Sulfur is generally not deficient for most crops in Oklahoma. A study conducted in 2000 showed an average of 38 lbs/A of sulfate-sulfur (SO_4-S) in the top six-inches of soils, and 129 lbs/A in the top 24 inches (Zhang, 2000). Recent field trials in Oklahoma did not show any response of canola to applied sulfur fertilizers.

Lime Recommendation (Table 4) for canola is based on the pH and the buffer index of the soil sample.

Table 4. Lime rates for canola production in Oklahoma. No lime is recommended when soil pH is 5.8 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

*ECCE (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:

Tons of ag-lime/A = Tons ECCE lime required / %ECCE of the ag-lime

References:

1. Zhang, et al. 2006. OSU Soil Test Interpretation. OSU Extension Facts F-2225.
2. Zhang, H. 2000. Soil Chloride, Nitrate, and Sulfate in Oklahoma Soils. PT 2000-1