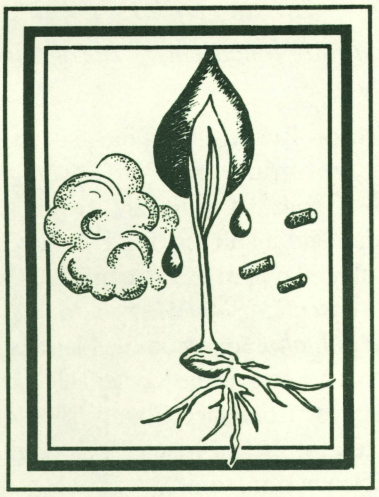

Northern Idaho Fertilizer Guide

Spring Canola

R. L. Mahler and S. O. Guy

Nitrogen (N), phosphorus (P), sulfur (S), and boron (B) are the nutrients most likely to limit spring canola production in northern Idaho.

The fertilization guidelines contained in this publication are preliminary. The nitrogen (N) recommendations are based on 2 years of field trials in northern Idaho and on Canadian research. The P, K, S, and B rates are based on research in winter rapeseed in northern Idaho.

The suggested fertilizer rates will be accurate for your field if (1) your soil samples are properly taken and represent the area to be fertilized and (2) the crop history you supply is complete and accurate. The recommendations also assume the use of good management practices. For soil sampling instructions, refer to bulletin 704, *Soil Sampling*. Sample the soil within 1 month of planting.

You can achieve optimal production and maximum returns from spring canola by managing the crop properly. Low yields are most often caused by delayed seeding, nonadapted varieties, poor stands, inadequate fertilization, or poor control of insects, weeds, or both.

Nitrogen

Total nitrogen need based on potential yield—Estimate the total N requirement based on the yield you expect given the growing conditions and your management practices (table 1).

Once you know the *total* amount of N needed to produce a spring canola crop, use equation 1 to determine the amount of fertilizer N to apply to meet this need.

Mineralizable nitrogen—Northern Idaho soils release mineralizable N (N contained in organic matter) in proportion to their organic matter contents (table 2). Low levels of mineralizable N are released from soils on severely eroded clay knobs and hilltops, soils in cutover timberlands, soils in areas of low precipitation, soils with low water-holding capacities, and soils with low organic matter contents.

Soil test nitrogen—You can evaluate the amount of inorganic N in the soil most effectively with a soil test. Take soil samples from the crop's entire rooting depth because nitrate-nitrogen (NO_3–N) is mobile in soil. Spring canola is capable of efficiently removing N to a depth of 3 feet or more unless its roots are blocked by a restricting layer.

Table 1. Estimated total N needed by a spring canola crop based on potential yield.

Potential yield (lb/acre)	Total N needed (lb/acre)
1,000	105
1,500	140
2,000	175
2,500	210
3,000	230

Table 2. Mineralizable N release rates for northern Idaho soils.

Organic matter content (%)	N release rate (lb/acre)
1	15
2	30
3	45
4	60

Soil test values include both NO_3-N and ammonium nitrogen (NH_4-N). To convert soil test NO_3-N and NH_4-N values in parts per million (ppm) to pounds N per acre, add the N values in ppm for each foot increment of sampling depth and multiply by 4 (table 3).

Example—With a potential yield of 1,700 pounds per acre, 2.0 percent

Equation 1.

$$\text{Fertilizer N needed} = \text{total N need based on potential yield (table 1)} - \left[\text{mineralizable N (table 2)} + \text{soil test N (table 3)}\right]$$

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Table 3. Calculation to convert N soil test results in ppm to pounds N per acre.

Depth (inches)	Soil test results NO_3-N (ppm)	+	NH_4-N (ppm)	=	Total N (ppm)	Total N[1] (lb/acre)
0 to 12	4	+	1	=	5	20
12 to 24	2	+	2	=	4	16
24 to 36	3	+	1	=	4	16
Total	9	+	4	=	13	52

[1]Total ppm x 4 = lb/acre.

soil organic matter, and soil levels of inorganic N from soil test values in table 3, the calculation for fertilizer N needed is:

Total N needed (table 1)	154
Minus mineralizable N (table 2)	-30
Minus soil test N (table 3)	-52
Equals N fertilizer required (lb/acre)	72

Extra N for stubble breakdown—If you incorporate stubble from a cereal crop into the soil before planting, you will need extra N for residue breakdown. Add 15 pounds of N per acre for each ton per acre of straw or nonlegume residue up to 50 pounds N per acre. Remember, 1 ton of residue is produced for each 20 bushels of wheat or 1,400 pounds of barley grain.

Phosphorus

Phosphorus deficiencies in spring canola are difficult to diagnose visually. Usually the plants remain dark green, but their growth is stunted.

Spring canola has a moderate requirement for P (table 4). Because P is not mobile in soils, it must be banded or incorporated into the soil. Commonly, P is broadcast-incorporated or drill-banded.

Table 4. Phosphorus fertilizer rates based on a soil test.

Soil test P[1] (ppm)	Application rate P_2O_5 (lb/acre)	P^2 (lb/acre)
0 to 2	60	26
2 to 4	40	18
more than 4	0	0

[1] Sodium acetate-extractable P in the 0- to 12-foot depth.

[2] P_2O_5 x 0.44 = P, or P x 2.29 = P_2O_5.

Potassium

Potassium (K) levels in northern Idaho soils are normally sufficient for spring canola production. Apply K when soils test low (table 5).

Potassium fertilizer can be surface broadcast-incorporated or drill-banded with the seed, below the seed, or to the side of the seed. When applied with the seed, the total N and K (as K_2O) should not exceed 20 pounds of nutrient per acre. Use whichever application method is most convenient.

Table 5. Potassium fertilizer rates based on a soil test.

Soil test K[1] (ppm)	Application rate K_2O (lb/acre)	K^2 (lb/acre)
0 to 50	80	66
50 to 75	60	50
more than 75	0	0

[1] Sodium acetate-extractable K in the 0- to 12-foot depth.

[2] K_2O x 0.83 = K, or K x 1.20 = K_2O.

Sulfur

Without adequate S, canola will appear light green to yellow and production will be less than maximum. Canola plants require S for efficient use of N.

Because S is mobile in soils, it is prone to leaching during the early spring. Consequently, soil testing for S is important. Apply 20 to 25 pounds of S per acre to soils containing less than 10 ppm SO_4-S. Sulfur can be surface-applied and will move into the soil with precipitation. Elemental S is not recommended because it becomes available to plants too slowly.

Micronutrients

Boron—Spring canola requires high levels of boron (B). On deficient soils—soils testing at less than 0.5 ppm B—apply 1 to 2 pounds of B in a uniform broadcast application. *Never band B.*

Boron can be toxic to canola if overapplied. Apply B only when soils are deficient. For information on B and availability of specific fertilizer materials, see CIS 608, *Essential Plant Micronutrients: Boron in Idaho.*

Zinc—Zinc (Zn) deficiencies are rare, occurring only in severely eroded soils. If soils are severely eroded and a soil test for Zn shows less than 0.6 ppm of Zn, consult CIS 617, *Essential Plant Micronutrients: Zinc in Idaho*, for recommendations. Canola growers in the Kootenai River Valley of Boundary County should soil test for Zn and watch for Zn plant deficiency symptoms.

Other micronutrients—Spring canola should not respond to applications of chlorine (Cl), copper (Cu), iron (Fe), manganese (Mn), or molybdenum (Mo). However, growers in the Kootenai River Valley of Boundary County should watch for manganese deficiencies.

Extensive field experiments on micronutrients have not been conducted. Still, micronutrient applications often are more likely to create toxicity problems than to correct deficiencies. Avoid applications of these materials in northern Idaho unless they are indicated by soil or tissue tests.

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EXT 604, *Soil Sampling*, $1.00

CIS 608, *Essential Plant Micronutrients: Boron in Idaho*, 40¢

CIS 617, *Essential Plant Micronutrients: Zinc in Idaho*, 40¢

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