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Northern Idaho Fertilizer Guide

Winter Rapeseed

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These fertilizer guidelines have been developed through preliminary research conducted by the University of Idaho (for actual data, see University of Idaho Bulletin 634 and University of Idaho Progress Report 226). The fertilizer rates suggested are based on research results from fallow fields and are designed to produce above average yields if other factors are not limiting production. Thus, the fertilizer guide assumes good management.

The suggested fertilizer rates will be accurate for your field if the soil samples were properly taken and represent the area to be fertilized. Optimum production and economical returns from rapeseed are achieved when the crop is managed properly. Low yields are most often caused by lack of adequate fertilization, poor pest control or poor stands that result when fields are waterlogged during winter or spring months or are too dry at planting.

Nitrogen (N)

Total N Needed Based on Potential Yield — N fertilizer needed to produce a crop of winter rapeseed can be estimated according to potential yield for the field. The amount of N needed to produce a winter rapeseed crop based on potential yield is shown in Table 1.

Once the total amount of N needed to produce a winter rapeseed crop is known, the following equation can be used to determine the amount of fertilizer N to be applied to meet this need:

$$\text{Fertilizer N needed} = \text{Total N needed based on potential} - \left[\text{mineralizable N (Table 2)} + \text{soil test N (Table 3)}\right]$$

Mineralizable Nitrogen — Soils vary in their capacity to release N from organic matter during the growing season. Since this is a factor in determining the amount of fertilizer N required to produce a crop of winter rapeseed, mineralizable N must be estimated. Mineralizable N is based on the soil's organic matter content.

Four different levels of mineralizable N release are used for northern Idaho soils (Table 2). Low release levels are found on severely eroded clay knobs and hill tops, cut-over timberland soils, soils in areas of low precipitation, soils with low water-holding capacities and soils with low organic matter content.

Nitrogen Soil Test — The amount of N in the soil can be evaluated most effectively with a soil test. The soil samples should represent the rooting depth of the crop since nitrate-nitrogen (NO_3-N) is mobile in the soil. Winter rape is capable of efficiently removing N to a depth of at least 3 feet unless roots are restricted by a root restricting layer.

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 to pounds N per acre, add the N values (ppm) for each foot increment of sampling depth and multiply by 4. A sample calculation is shown in Table 3.

Estimate Based on Previous Crop — You may also estimate the amount of N fertilizer required for winter rapeseed on the basis of the previous crop. The values in Table 4 are generalized recommendations based on field experiments and observations of production after the various crops. Note, however, that N recommendations based on the previous crop are not as accurate as a recommendation based on a good soil test.

Phosphorus (P)

Winter rapeseed has a moderate requirement for phosphorus. Since phosphorus is not mobile in soils, common methods of application are broadcast-plowdown, broadcast-seedbed incorporated and drill-banding. The amount of P needed based on soil tests is shown in Table 5.

Potassium (K)

Potassium levels are normally sufficient for rape production, but K should be applied when soils test low (Table 6). Broadcast-plowdown, broadcast-seedbed incorporated and drill-banding are all effective methods of application. Drill-banding fertilizer can be placed with,

Table 1. Estimated total N needed by winter rapeseed crop based on potential yield.

lb seed/acre	1,500	2,200	3,000	>4,000
lb N/acre	160	200	240	280

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

	Organic matter content			
	<2%	2 to 3%	3 to 4%	>4%
Release level	low	medium	medium high	high
lb N released	30	40	50	60

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

Depth	Soil test reads NO_3-N	NH_4-N	Total	Total N*
(inches)	(ppm)	(ppm)	(ppm)	(lb/acre)
0 to 12	5	1	6	24
12 to 24	6	2	8	32
24 to 36	8	1	9	36
Total	19	4	23	92

*ppm × 4 = lb/acre

The calculation for N fertilizer needed is:

Total N needed (Table 1)	
Minus mineralizable N (Table 2)	-
Minus soil test N (lb/acre) (Table 3)	-
N fertilizer required (lb/acre)	=

*Extra N is not needed for breakdown of residue if rape is planted into fallow ground. If stubble is left standing through the winter and summer and plowed down before planting, add 15 pounds available N for each ton of straw or non-legume residue incorporated into the soil 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 produced.

Example — With a yield potential of 2,200 lb/acre, 2.5% soil organic matter and soil levels of N from soil test values from Table 3, the calculation for fertilizer N needed is:

	lb/acre
Total N needed (Table 1)	200
Minus mineralizable N (Table 2)	−40
Minus soil test N (Table 3)	−92
N fertilizer required (lb/acre)	68

Table 4. Estimated nitrogen fertilizer requirements for winter rape based on previous crop.

Previous crop	Potential yield (lb/acre) 1,500	2,200	3,000	>4,000
	Estimated N fertilizer to apply (lb/acre)			
Fallow	50 to 70	75 to 95	120 to 140	170 to 190
Grain (residue returned)	140 to 160	155 to 185	210 to 230	265 to 285
Grain (residue removed)	100 to 120	115 to 145	170 to 190	225 to 245
Alfalfa or green manure	40 to 60	65 to 85	110 to 130	160 to 180

Table 5. Phosphorus fertilizer rates based on soil test.

Soil test* (0 to 12 inch) (ppm)	Apply (lb/acre) (P_2O_5)	(P^{**})
0 to 2	60	26
2 to 4	40	18
over 4	0	0

*Sodium acetate extractable P
**P_2O_5 × 0.44 = P or P × 2.29 = P_2O_5

Table 6. Potassium fertilizer rates based on soil test.

Soil test* (0 to 12 inch) (ppm K)	Apply (lb/acre) (K_2)	(K^{**})
0 to 50	80	66
50 to 75	60	50
over 75	0	0

*Sodium acetate extractable K
**K_2O × 0.83 = K or K × 1.20 = K_2O

below or to the side of the seed. When applied with the seed, the total of N plus K (as K_2O) should not exceed 25 pounds per acre. The choice of application method depends upon which one is most convenient to the grower.

Sulfur (S)

Adequate levels of sulfur are necessary for maximum production of winter rapeseed. Without adequate sulfur the rape will appear light green to yellow in color. Plants require sulfur to use nitrogen efficiently. Since sulfur is mobile in soils, it is prone to leaching during the winter and early spring. Consequently, soil testing for sulfur is important. Sulfur needs based on soil test results are shown in Table 7. Since sulfur is mobile, it can be surface-applied and will move into the soil with precipitation. Do not use elemental S, as it is only slowly available to plants.

Table 7. Sulfur (S) fertilizer needs based on a soil test.

Soil test* (0 to 12 inch) (ppm SO_4-S)	Apply (lb/acre) (S)
0 to 10	25
over 10	0

Micronutrients

Boron (B) — Winter rapeseed is a high B requiring crop. On deficient soils — soils testing less than 0.5 ppm B — apply 1 to 2 pounds of B uniformly to the soil in a broadcast application. Never band B. For information on B and availability of specific fertilizer materials, see University of Idaho CIS 608, *Boron in Idaho.*

Zinc (Zn) — Zinc deficiencies are rare, occurring only on severely eroded soils. If soils are severely eroded and a soil test for Zn shows less than 0.6 ppm Zn, applications of 5 pounds Zn per acre are recommended. For information on Zn, see University of Idaho CIS 617, *Zinc in Idaho*. Rapeseed growers in the Kootenai River Valley of Boundary County should watch for potential Zn deficiencies.

Other Micronutrients — Winter rape should not respond to applications of chlorine (Cl), copper (Cu), iron (Fe), manganese (Mn) or molybdenum (Mo). Although field experiments have not been conducted, applications pose greater chances of creating toxicity problems than correcting deficiences. Therefore, avoid applications of these materials in northern Idaho. Growers in the Kootenai River Valley of Boundary County should watch for potential manganese deficiencies.

General Comments

1. Nitrogen fertilizer applications should be split between spring and fall. Research has shown that total fall applications result in reduced winter hardiness of the rape. Fall-applied N is also susceptible to leaching. Consequently, no more than 50% of the required nitrogen should be applied in the fall.

2. P and/or K should be applied before planting and incorporated into the seedbed.

3. Sulfur can be either incorporated or surface-applied in the fall. Sulfur may also be applied with N in the spring.

4. Contact your County Agricultural Agent if you need more information.

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