



# Fertilizing Mustard, Rapeseed, Canola and Crambe

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Mustard and rapeseed are oil seed crops. Mustard is also used as a condiment in the form of table mustard. Rapeseed and mustard are less drought tolerant than wheat but have a high degree of potential for regeneration when unfavorable environmental conditions improve. Both crops prefer relatively low temperatures up to the flowering stage and can tolerate higher temperatures during the generative stage. These crops should be planted from early to mid May in North Dakota.

**Yield Goal:** Yield is influenced by: 1) local climate; 2) soil type; and 3) management (timeliness of field operations, plant population, variety, fertility, weed control, etc.). Your yield goal should be as great or slightly greater than the highest yield produced on the field. If this is the first time that you are growing mustard or rapeseed, base your yield goal on what others have been able to obtain in your area (see Circular SF-822). With good environmental conditions and management, yields of up to 1800 pounds per acre are not uncommon.

Excessive fertilizer use, especially nitrogen and phosphorus, has potential to degrade ground and surface water quality. Establishing realistic yield goals, carefully soil sampling fields and fertilizing crops according to soil tests will help preserve water quality.

**Fertilizer Recommendations:** Tables 1 and 2 show the amount of soil nitrate-nitrogen in the top 2 feet of soil plus nitrogen fertilizer needed to meet the crop requirements for various yield goals. These data are based on nitrate-nitrogen levels in the soil samples taken between September 15 and April 1. If soil samples are taken between July 1 and September 15 subtract 0.5 pound of nitrogen from the recommendation for each day the soil was sampled prior to September 15. These adjustments are automatically included in recommendations received from the North Dakota State University Soil Testing Laboratory.

The phosphate ( $P_2O_5$ ) and potash ( $K_2O$ ) recommendations in Table 1 and Table 2 are for **broadcast application**. Drill-row applications of  $N + K_2O$  should not exceed 10 pounds per acre to avoid the possibility of germination damage. If you prefer to band all of the fertilizer, keep the bands at least 2 inches from the seed.

Broadcast application rates can be reduced when phosphorus and potash is band applied on very low testing soils. To convert the broadcast rate of P and K to the band rate, reduce the broadcast rate by one third. Reduce the broadcast rate only when banding on **very low** testing soils. If the broadcast rate for low testing soils were reduced, you would not be applying enough phosphorus and/or potassium to maintain the level in the soil. The result would then be an increasingly infertile soil which is not conducive to high yields.

Since phosphorus and potassium move very little in the soil, it is possible to "build up" or increase the available level of these nutrients in the soil. The application of approximately 20 pounds of  $P_2O_5$  per acre will increase the phosphorus soil test level by 1. In other words, if your phosphorus soil test level is 5 and you prefer to operate at test level of 12, the application of 140 pounds of  $P_2O_5$  (305 pounds of 18-46-0) per acre thoroughly mixed in the top 6 inches of soil will raise the soil test level by 7. Likewise, the application of 10 pounds of  $K_2O$  per acre will increase the potassium soil test by 1. Nitrogen requirements should be applied each year as needed.

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**Methods of Application:** The best method of nitrogen application will depend on the nitrogen source used. For example, anhydrous ammonia should be applied 4-6 inches beneath the soil surface, while nitrogen solutions, broadcast urea and other dry nitrogen fertilizer products should be worked into the soil shortly after application. Applying nitrogen fertilizer on well drained sandy soils in the fall is not recommended because of possible loss by leaching.

Crops growing on soils that test very low in P and/or K depend heavily on applied fertilizer. On soils testing medium or above, the crop is much less dependent on applied fertilizer for its current needs. Fertilizer is applied on these soils mainly to replace that removed by the crop and/or as a starter to get the crop off to a fast start. On very low testing soils where the plants largely depend on fertilizer for their current needs the method of application will influence the amount of fertilizer a crop

recovers. **Broadcast** fertilizer is thoroughly mixed with the soil and as a result some is positionally unavailable to plant roots. **Band or drill row** fertilizer is applied closer to the seed and can be recovered by the crop more efficiently. Broadcast applications of phosphate and potash will be more efficient when applied before a deep tillage operation. Recent data indicates that a band application of P at a depth of 4 or 6 inches is more effective than when drill row applied. This method of application will also prevent a buildup of nutrients at the soil surface under minimum tillage.

**Other Nutrients:** Sulfur deficiencies are not common in North Dakota, but may occur early in the growing season on sandy soils. If your crop appears to be deficient in nitrogen but does not respond to nitrogen applications, sulfur may be deficient. Responses to iron, zinc, copper and manganese have not been observed on mustard, rapeseed, or crambe in North Dakota.

**Nutrient recommendations for mustard, rapeseed and canola.**

Yield goal	Soil N plus fertilizer N required	Soil Test Phosphorus, ppm					Soil Test Potassium, ppm					
		Bray-I	VL	L	M	H	VH	VL	L	M	H	VH
		Olsen	0-5	6-10	11-15	16-20	21+	0-40	41-80	81-120	121-160	161+
			0-3	4-7	8-11	12-15	16+					
cwt/a	lb/acre-2'		----- lb P <sub>2</sub> O <sub>5</sub> /acre -----					----- lb K <sub>2</sub> O/acre -----				
10	65		35	25	15	0	0	50	35	20	0	0
15	100		50	35	20	10	0	70	50	30	10	0
20	130		65	45	30	10	0	95	70	40	15	0
25	165		80	60	35	15	0	120	85	50	15	0

Nitrogen recommendation = 6.5 YG - STN + SDA - PCC  
 Bray-I P recommendation = (3.60-0.17 STP)YG  
 Olsen P recommendation = (3.60-0.22 STP)YG  
 Potassium recommendation = (5.400-0.034 STK)YG

The abbreviations used in the equations are as follows:  
 YG = yield goal  
 STN = soil test nitrogen  
 STP = soil test phosphorus  
 STK = soil test potassium  
 SDA = sampling date adjustment  
 PCC = previous crop credit

**Nutrient recommendations for crambe.**

Yield goal	Soil N plus fertilizer N required	Soil Test Phosphorus, ppm					Soil Test Potassium, ppm					
		Bray-I	VL	L	M	H	VH	VL	L	M	H	VH
		Olsen	0-5	6-10	11-15	16-20	21+	0-40	41-80	81-120	121-160	161+
			0-3	4-7	8-11	12-15	16+					
lb/a	lb/acre-2'		----- lb P <sub>2</sub> O <sub>5</sub> /acre -----					----- lb K <sub>2</sub> O/acre -----				
1000	50		35	25	15	10	0	50	35	20	0	0
1500	75		50	35	20	10	0	70	50	30	0	0
2000	100		65	50	30	15	0	95	70	40	10	0
2500	125		80	60	35	20	0	120	85	50	10	0

Nitrogen recommendation = 0.05 YG - STN + SDA - PCC  
 Bray-I P recommendation = (0.0360-0.0018 STP)YG  
 Olsen P recommendation = (0.0360-0.0023 STP)YG  
 Potassium recommendation = (0.05400-0.00036 STK)YG

The abbreviations used in the equations are as follows:  
 YG = yield goal  
 STN = soil test nitrogen  
 STP = soil test phosphorus  
 STK = soil test potassium  
 SDA = sampling date adjustment  
 PCC = previous crop credit

