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Fertilizing Flax

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Fertilizing Flax

Cooperative Extension Service
South Dakota State University
U.S. Department of Agriculture

Fertilizing Flax

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High yields of flax depend directly on reasonably high levels of available soil fertility. Total plant uptake of nitrogen (N), phosphorus (P₂O₅), and potassium (K₂O) will be approximately 3.2 lbs, .9 lb, and 2.7 lbs respectively for each bushel of grain produced. Much of today's mediocre flax yields may be caused by inadequate levels of soil plant food, particularly nitrogen.

Phosphorus, potassium, and other nutrients are equally essential for high flax yields; however, research shows soil reserves of these nutrients can approach rather low soil test levels before the addition of such fertilizers will significantly increase yields.

Therefore, particular attention should be given to providing optimum levels of nitrogen in fields seeded to flax. High total nitrogen requirements coupled with efficient root feeding may explain in part the reason crops following flax show symptoms of nitrogen shortage. Failure to replace those amounts of nitrogen may seriously restrict yields of crops immediately following flax.

Fertilizer rates

Rates of fertilizer application should be based on both desired yield goal and nutrient reserves in the soil.

Nitrogen recommendations can vary from 0 lbs N on a very high testing soil to perhaps 100 lbs or more on a very low testing soil, depending on yield desired. Phosphorus recommendations can vary from 0 lbs P₂O₅ per acre to

perhaps 40 lbs. Potash recommendations will vary from 0 to 80 lbs K₂O per acre.

Tables 1, 2, and 3 show the actual pounds of N, P₂O₅, and K₂O that would be recommended, depending on yield desired and existing soil test levels. Regular use of the deeper nitrate nitrogen soil test, now offered as part of the general soil test, measures unusually high or low levels of carryover nitrogen fertility. This enables farmers to make needed adjustments in final fertilizer rates.

Fertilizer application

Failure to properly apply recommended rates of fertilizer can actually cause reduced yield. For example, excessive rates of nitrogen and potash placed with the seed at planting can severely reduce plant stands and yield.

This can be prevented by broadcasting and incorporating the fertilizer before seeding. Combined total actual nitrogen and potash should not exceed 10 lbs per acre when applied with a drill attachment at the time flax is seeded. Research shows phosphorus is much less toxic to seedlings such as flax.

Some drill fertilizer attachments do not place all of the material in direct contact with the seed. Rates somewhat in excess of the above mentioned 10 lbs per acre can then be used.

Good soil moisture levels at seeding time and fine textured soils greatly reduce the potential hazards of fertilizer damage to flax seedlings. Limited research strongly suggests that urea forms of nitrogen placed with the seed are more toxic than ammonium nitrate for sensitive crops like flax. This hazard can be removed completely by broadcasting the fertilizer.

Broadcast applications of fertilizer on fields to be seeded to flax should be plowed under or incorporated with tillage equipment that places it plow layer deep without a thorough mixing action. Discing in broadcast fertilizer is less desirable because the shallow mixing and placement greatly increase weed competition at the expense of the flax crop.

Table 1. Nitrogen recommendations, lbs /A

Yield goal, bu/A	Nitrogen soil tests						
	Nitrate nitrogen Nitrogen needed, lbs N/A*	% Organic matter					
		Non-fallow		Fallow			
		Low 2.0	Medium 3.0	High 4.0	Low 2.0	Medium 3.0	High 4.0
		Nitrogen recommended, lbs N/A					
10	30	30	0	0	0	0	0
15	45	45	0	0	0	0	0
20	60	55	30	0	20	0	0
25	75	60	35	0	20	0	0
30	90	65	40	0	30	0	0
40	120	80	55	25	40	20	0
50	150	90	65	35	50	30	20

*Nitrogen required (lbs/A) minus nitrate N soil test at 2-foot level (lbs/A) equals nitrogen recommended.
Example for 20 Bu/A yield: 60 (N needed) - 40 (nitrate soil test) = 20 lbs N to be applied.

Table 2. Phosphorus recommendations, lbs P₂O₅/A

Yield goal, bu/A	Phosphorus soil tests, lbs P/A		
	Low 6 - 15	Medium 16 - 25	High 26 - 35
	P ₂ O ₅ recommended, lbs/A		
10	15	0	0
15	15	0	0
20	15	0	0
25	15	15	0
30	25	15	0
40	30	25	25
50	35	30	30

Table 3. Potassium recommendations, lbs K₂O/A

Yield goal, bu/A	Potassium Soil Tests, lbs K/A		
	Low 51-120	Medium 121-210	High 211-300
	K ₂ O recommended, lbs/A		
10	25	10	0
15	30	10	0
20	35	25	0
25	45	30	10
30	50	35	25
40	60	45	30
50	65	50	35

Topdressing nitrogen fertilizer on established stands of flax is not a common practice but can be a backup fertilizer practice where needed. It should be done as early as possible and well before flowering. Severe crop injury from burning and poor results can occur when topdress nitrogen rates, as liquid fertilizer, exceed 25 lbs per acre actual nitrogen.

Miscellaneous fertility management

Farmers often notice abnormal growth patterns in flax fields. A very common symptom will be unusually light green to almost yellow plants. A pale green color over most of a field is often a signal that nitrogen deficiency exists.

Nitrogen deficiencies in growing flax can be corrected by making broadcast applications at the recommended rate. This method of application often causes greater weed competition than where fertilizer is plowed under before seeding.

Severe yellowing is also often observed in flax plants growing in low, poorly drained, fine textured soil areas of fields. Most agronomists blame this abnormal color on a lack of iron and/or manganese uptake. As these field areas become better drained and warm up, the deficient plants usually regain normal color and growth. Limited research has not shown foliar applications of iron or manganese fertilizers to be profitable in correcting such deficiencies.

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