University of Idaho
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CIS 1084

Northern Idaho Fertilizer Guide

Spring Peas

by Robert L. Mahler

Fertilizer guidelines, such as this one for spring peas, were developed by the University of Idaho and Washington State University based on relationships between soil tests and crop yield responses. The guidelines are based on research results and are designed to produce above-average yields if other factors are not limiting production. Thus, this fertilizer guide assumes the use of sound management practices.

The suggested fertilizer rates will be accurate for your field provided (1) your soil sample was properly taken and represents the areas to be cropped and (2) the crop and fertilizer history you supply is complete and accurate. For help in obtaining a proper soil sample, refer to University of Idaho Bulletin 704, *Soil Sampling*, or consult the extension educator in your county.

Nitrogen

Spring peas are legumes that can obtain or "fix" a portion of the nitrogen (N) they require from the atmosphere. The fixing is done by bacteria (*Rhizobium leguminosarum*) that form nodules on the roots of spring peas. These bacteria are present in adequate amounts in most northern Idaho soils.

Seed should be inoculated with this bacterium when (1) spring peas have not been grown in the field for 5 or more years before planting or (2) the soil pH is less than 5.7. Spring peas are most commonly inoculated with *Rhizobium* in a peat-based carrier using a custom inoculation, seed-applied system. Follow the inoculum manufacturer's recommendation for the inoculum rate per bushel of seed. If custom seed inoculation is not available, a peat-based carrier can be used with the planter box, seed-applied system. For additional information on inoculation and methods of inoculum application, see University of Idaho CIS 838, *Inoculation of Legumes in Idaho*.

In addition to fixed N, the soil often supplies some residual N as well as N from decomposing organic matter. Thus, N applications on spring peas in most cases have not been profitable. However, spring peas need to obtain some N from the soil early in their growth, before effective N-fixing nodules have formed.

Phosphorus

Phosphorus (P) needs can be determined effectively with a soil test (Table 1). Incorporate P into the seedbed by whatever method is most convenient. Acceptable methods include (1) broadcast and plow-down or disk-in, (2) band, and (3) drill with seed. Do not allow direct contact between the seed and any fertilizer containing more than P. Germinating spring peas are extremely sensitive to salts contained in fertilizer N, K, and S. If heavy P applications are required to correct nutrient deficiencies, apply fertilizer before or during seedbed preparation.

Table 1. Phosphorus fertilizer rates for spring peas based on a soil test.

Soil test P (0 to 12 inches)[1]			Application rate[2]	
NaOAc	Bray I	$NaHCO_3$	P_2O_5	P
(ppm)	(ppm)	(ppm)	(lb/acre)	(lb/acre)
0 to 2	0 to 20	0 to 8	60	26
2 to 3	20 to 30	8 to 10	40	18
3 to 4	30 to 40	10 to 12	20	9
over 4	over 40	over 12	0[3]	0

[1] Soil test P can be determined by three different procedures: sodium acetate (NaOAc), Bray I method, or sodium bicarbonate ($NaHCO_3$). Sodium bicarbonate should not be used on soils with pH values less than 6.2. Use the column indicated by your soil test report.

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

[3] Under reduced tillage, apply up to 20 lb P_2O_5 per acre on soils testing in excess of 4 ppm (NaOAc soil test).

Table 2. Potassium fertilizer rates for spring peas based on a soil test.

Soil test K (0 to 12 inches)[1]	Application rate[2] K_2O	Application rate[2] K
(ppm)	(lb/acre)	(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] $K_2O \times 0.83 = K$, or $K \times 1.20 = K_2O$.

Potassium

Potassium (K) needs can be determined with a soil test (Table 2). Incorporate K into the seedbed by whatever method is most convenient. Acceptable methods include (1) broadcast and plow-down or disk-in, (2) band, and (3) drill with seed. Do not allow direct contact between the seed and the fertilizer because peas and spring peas are sensitive to salts during germination. If heavy K applications are required to correct nutrient deficiencies, apply fertilizer before or during seedbed preparation.

Sulfur

Without adequate sulfur (S), spring pea plants are unable to fix enough atmospheric N to meet their needs. Consequently, soils testing at less than 10 ppm SO_4-S should receive 15 pounds of S per acre. Avoid using granular elemental S on spring peas because this form of S becomes available slowly. Elemental S also greatly reduces soil pH. Sulfur needs of spring peas based on a soil test are shown in Table 3.

Table 3. Sulfur fertilizer needs of spring peas based on a soil test.

Soil test S (0 to 12 inches)		S application rate
(ppm SO_4-S)	(ppm S)	(lb/acre)
0 to 10	0 to 4	20
over 10	over 4	0

Micronutrients

Boron—Spring peas grown in northern Idaho respond to boron (B) applications. Boron need can be determined by a soil test. Soils testing at less than 0.5 ppm B should receive 1 pound of B per acre. Boron can be toxic at excessive rates or when concentrated near seedlings. Boron fertilizer should always be broadcast, never banded. For more information on B and specific fertilizer materials, refer to University of Idaho CIS 1085, *Essential Plant Micronutrients: Boron in Idaho*.

Molybdenum—Spring peas grown in northern Idaho also respond to molybdenum (Mo). Because Mo is present in soil in only small amounts, soil Mo analysis is not commercially available. Consequently, base Mo fertilizer applications on cropping history and soil pH. Apply Mo as a seed treatment on spring peas at the rate of ⅛ to ½ ounce Mo per acre when (1) the soil pH is less than 5.7 or (2) every third time spring peas are grown in a field. Do not exceed ½ ounce Mo per acre because at higher rates the N-fixing bacteria may die. For more information on Mo, refer to University of Idaho CIS 1087, *Essential Plant and Animal Micronutrients: Molybdenum in Idaho*.

Zinc—Response of spring peas to zinc (Zn) applications is extremely rare. Zinc applications of 5 pounds per acre should be considered only where Zn soil test levels are less than 0.6 ppm. For more information on Zinc, refer to University of Idaho CIS 1088, *Essential Plant Micronutrients: Zinc in Idaho*.

Other micronutrients—Spring peas have not been reported to respond to applications of chlorine (Cl), copper (Cu), iron (Fe), or manganese (Mn). Therefore, applications of these materials in northern Idaho is unnecessary.

Lime—Consider lime applications of 1 ton per acre on fields with pHs of 5.3 and below. Reduced spring pea yields may occur at soil pHs of 5.4 or lower. However, the yield response from liming at pH values near 5.4 may not always be economical. For additional information on the impact of soil pH on spring peas, refer to University of Idaho CIS 811, *The Relationship of Soil pH and Crop Yields in Northern Idaho*.

Agronomy/Water quality considerations

- Weeds, insects, diseases, and environmental stress can influence the effectiveness of a fertilizer program and reduce yields.
- Spring peas take up residual soil nitrates (nitrates not used by the preceding cereal crops) and therefore reduce the potential for N loss by leaching. Thus, spring peas can have a positive impact on groundwater quality.
- Spring peas are capable of fixing most of the nitrogen they need from the atmosphere. Soils in northern Idaho generally contain adequate amounts of the soil bacteria (rhizobia) that are responsible for this nitrogen-fixation process. Consequently, inoculation of peas with rhizobia is not necessary in fields that have a history of pea or lentil production.

- Early planting of spring pea varieties is critical for maximum economic yields.
- Using spring peas in a crop rotation can reduce disease and weeds problems in grain crops.
- Spring-planted peas have generally been planted in seedbeds having a minimum of straw residue on the soil surface. However, spring peas grown under conservation tillage systems with moderate levels of surface residue typically produce similar or higher yields than peas grown under low-residue, intensive tillage systems. The greatest yield benefits are in relatively dry years.
- To prevent soil compaction, avoid tillage at high soil moisture levels. Also avoid overworking the soil and creating a finely pulverized surface that is vulnerable to erosion and prone to sealing and crusting.
- Avoid planting in poorly drained areas.
- If you need further information on cultural practices contact the extension educator in your county.
- Starter, or pop-up, fertilizers have limited success on spring peas. Starter fertilizers have been most effective when soils were cold and root growth could be stimulated by a readily available supply of P.
- Banding fertilizer improves P use efficiency. Consequently, if banding P, cut the recommended fertilizer application rate by 10 to 15 percent.

Further reading

BUL 704, *Soil Sampling*, $2.00
CIS 811, *The Relationship of Soil pH and Crop Yields in Northern Idaho,* 35 cents.
CIS 838, *Inoculation of Legumes in Idaho, 35 cents*
CIS 1085, *Essential Plant Micronutrients: Boron in Idaho*, $3.00
CIS 1087, *Essential Plant and Animal Micronutrients: Molybdenum in Idaho*, $1.00
CIS 1088, *Essential Plant Micronutrients: Zinc in Idaho*, $3.00

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CIS 820, *Grass Seedings for Conservation Programs*
CIS 826, *Chickpeas*
CIS 851, *Legume and Legume-Grass Pastures*
CIS 853, *Grass Pastures*
CIS 911, *Northern Idaho Lawns*, also available in print for $1.00
CIS 920, *Spring Barley*
CIS 954, *Winter Barley*
CIS 1012, *Spring Canola*
CIS 1083, *Lentils*
CIS 1084, *Spring Peas*
CIS 1101, *Soft White Spring Wheat*

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