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Northern Idaho Fertilizer Guide

Chickpeas

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These fertilizer guidelines have been developed by the University of Idaho and Washington State University based on relationships between soil tests and yield response for peas and lentils. The fertilizer rates suggested are designed to produce above average yields if other factors are not limiting yields. The fertilizer guide assumes good management.

The suggested fertilizer rates will be accurate for your field provided (1) the soil sample was properly taken and is representative of the areas to be fertilized, and (2) the crop and fertilizer history supplied is complete and accurate. For help in obtaining a proper soil sample, confer with your Extension agricultural agent.

Nitrogen

Chickpeas are legumes that are capable of obtaining or "fixing" a large portion of the nitrogen (N) they require from the atmosphere. This is accomplished by nodules formed on the roots of the chickpea plant. The bacteria (rhizobia) that form these nodules on the roots of chickpeas are different from the rhizobia that nodulate peas and lentils and are not normally found in northern Idaho soils. The inoculum specific to chickpeas should be used when (1) chickpeas have not been grown on a field within the last 2 years or (2) when the soil pH is less than 5.7.

Most chickpea seed is treated with captan. This fungicide is harmful to rhizobia, so inoculating chickpea seed with rhizobia requires special handling in one of three ways. One method is to place a granular inoculum in the seed row at planting. Several companies manufacture granular inocula.[1] The application rate should be between 5 and 10 pounds of granular inoculum per acre depending on the time since chickpeas were last planted in the field. Another alternative is to add a peat-based inoculum at twice the recommended rate to the drill box (slurry method) just before planting. The third option, possible in areas where water mold-type fungi (*Pythium* etc.) are the major pathogens, is to use metalaxyl as the fungicide instead of captan. Chickpea seed can be treated with a peat-based inoculum if metalaxyl is used.

[1]Nitragin Company, Milwaukee, WI; RhizoGen Corp, Saskatoon, Saskatchewan; Research Seeds, Columbia, MO, and Cellpril, Inc., Manteca, CA, are sources of granular inocula. The names of these companies are provided as sources for growers. Listing them does not imply endorsement of the firms or the product by the Idaho Agricultural Experiment Station nor criticism of companies not mentioned.

Phosphorus

Phosphorus (P) should be incorporated into the seedbed before planting or applied at planting by whatever method is most convenient for the grower. P fertilizer can be surface-broadcast and plowed down or tilled into the soil. It can also be banded or drilled with the seed. Be careful not to allow direct contact between the seed and the fertilizer if the fertilizer material contains any N or potassium in addition to P. Chickpeas are sensitive to excess salts (contained in N and potassium) during germination. If heavy applications are required to correct nutrient deficiencies, apply P before or during seedbed preparation. Phosphorus needs can be determined effectively with the aid of a soil test (Table 1).

Table 1. Phosphorus fertilizer rates based on a soil test.

Soil test* (0 to 12 inch)	Apply (lb/acre)
(ppm)	(P_2O_5)
0 to 2	60
2 to 4	40
over 4	0

*Sodium acetate extractable PO_4-P.
**P_2O_5 × 0.44 =O.

Potassium

Soils in northern Idaho usually contain sufficient potassium (K) for chickpea production. If soils are deficient, K should be incorporated into the seedbed by

whatever method is most convenient for the grower. K fertilizer can be surface-broadcast and plowed down or tilled into the soil. It can also be banded or drilled with the seed. Do not allow direct contact between the seed and the fertilizer because chickpeas are sensitive to the salts in K fertilizers during germination. If heavy applications are required to correct nutrient deficiencies, apply K before or during seedbed preparation. Potassium needs can effectively be determined with the aid of a soil test (Table 2).

Table 2. Potassium fertilizer needs based on a soil test.

Soil test* (0 to 12 inch)	Apply (lb/acre)
(ppm)	(K_2O)
0 to 50	80
50 to 75	60
over 75	0

* Sodium acetate extractable K.
**$K_2O \times 0.83 = K$.

Sulfur

Adequate levels of sulfur (S) are necessary for maximum production of chickpeas. Without adequate S, chickpeas are not able to fix enough atmospheric nitrogen to meet the nitrogen needs of the plants. Consequently, soils testing less than 10 ppm SO_4-S should receive 15 to 20 pounds of S per acre. Avoid using granular elemental S applications on chickpeas because this form of S is only slowly available to the plant and greatly reduces soil pH. Sulfate forms of S fertilizers are readily available and do not acidify soils.

Boron

Chickpeas grown in northern Idaho may respond to boron (B) applications. Boron need can be determined by a soil test. Soils testing less than 0.5 ppm B should receive 1 to 2 pounds of B per acre. Boron can be toxic to chickpeas if application rates are excessive or if it is concentrated too close to the seedling. Boron fertilizer should always be broadcast, never banded. For more information on B and specific fertilizer material, refer to University of Idaho CIS 608, *Boron in Idaho.*

Molybdenum

Chickpeas grown in northern Idaho may respond to applications of molybdenum (Mo). Because Mo is present in only small amounts, a soil test for Mo is not commercially available. Consequently, Mo fertilizer recommendations are based on cropping history and soil pH. Mo can be conveniently applied as a seed treatment at the recommended rate of 1 ounce per acre. If Mo fertilizer is applied to the soil, a rate of 1 pound ammonium molybdate or sodium molybdate per acre should be used when (a) the soil pH is less than 5.7, or (b) every third time a legume (chickpeas, peas or lentils) is grown on a field. For more information on Mo fertilizers, application methods and application rates refer to University of Idaho CIS 589, *Molybdenum in Idaho.*

Other Micronutrients

Chickpeas grown in northern Idaho would not be expected to respond to applications of chlorine (Cl), cobalt (Co), copper (Cu), iron (Fe), manganese (Mn) or zinc (Zn). Therefore, applications of these materials in northern Idaho are not needed.

Lime

Lime application of 1 ton/acre for chickpeas should be considered on fields with pH values of 5.3 or less. Reduced chickpea yields may occur at soil pH 5.4 to 5.5. The yield response from liming may not be economical when soil pH is above 5.3, however. Low soil pH reduces the nitrogen fixation potential of chickpeas. For more information on lime materials, refer to University of Idaho CIS 787, *Liming Materials.*

General Comments

1. Early planting of chickpeas is of utmost importance to achieve maximum yields. Chickpeas should be seeded as soon as a good seedbed can be prepared and the soil temperature exceeds 45°F.
2. Use of chickpeas in 3-year rotation reduces disease and weed problems that affect grain production.
3. Obtain certified seed. It is important to use Ascochyta-free seed. Growers may consider the production of varieties such as UC-5, Lyons and Aztec.
4. Treat the seed with a fungicide to prevent seed decay.
5. Apply inoculum containing *Rhizobium* to ensure nodulation and optimum nitrogen fixation. Chickpeas should always be inoculated if planted less frequently than every 3 years. Remember, the *Rhizobium* that nodulates peas, lentils, alfalfa and clover will not nodulate chickpeas.
6. The seedbed should contain adequate moisture but should not be wet enough to form large clods or be compacted during seedbed preparation and planting. Avoid overworking the soil and creating a finely pulverized surface.

For further information on cultural practices for chickpeas, contact your Extension agricultural agent, or obtain a copy of University of Idaho Bulletin 664, *Dry Pea, Lentil and Chickpea Production in Northern Idaho.*

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