

Fertilizer Guide

FG 65
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Onions—Mineral Soils (Eastern Oregon—East of Cascades)

Good management practices are essential if optimum fertilizer responses are to be realized. These practices include adequate irrigation, use of recommended varieties, selection of adapted soils, weed control, disease and insect control, good seed bed preparation, proper seeding methods, and timely harvest.

Because of the influence of soil type, climatic conditions, and other cultural practices, crop response from fertilizer may not always be accurately predicted. Soil test results, field experience, and knowledge of specific crop requirements help determine the nutrients needed and the rate of application.

The fertilizer application should insure adequate levels of all nutrients--optimum fertilization is essential for top quality and yields.

Recommended soil sampling procedures should be followed in order to estimate fertilizer needs. The Oregon State University Extension Service agent in your county can provide you with soil sampling instructions, soil sample bags, and information sheets.

NITROGEN (N)

Onions require a good supply of available N; however, excess N applications can result in late maturity, large necks that are difficult to cure, soft onion bulbs, and poor storage quality.

A higher percentage of fertilizer N is absorbed by the plant if the fertilizer is applied when the onion root system is well developed. Split applications of nitrogen are used more effectively by the plant than a single preplant application.

Sidedressed nitrogen applications or nitrogen applied in irrigation water can be an effective means of providing supplemental nitrogen to the crop during the season. Do not use aqua or anhydrous ammonia in sprinkler irrigation.

Excessive irrigation that causes nitrogen movement beyond the root system can reduce nitrogen

available to the plants. Additional nitrogen may be required during the season under these conditions.

Shallow incorporation of high rates of top-dressed or broadcast fertilizer N can seriously reduce onion stands. A high rate of fertilizer N applied before planting should be incorporated into the plow layer or banded well away (6") from the seed on the furrow side of rows in two-row onion beds.

Excessive nitrogen available to onions, particularly later in the season (mid-July), can delay onion maturity and make field curing of onions more difficult. Inadequate field curing before storage can result in greater losses because of rot.

Onion varieties which differ markedly in yield potential can be expected to differ somewhat in their requirements for nitrogen. Higher yielding varieties may require slightly more nitrogen.

Onion stands (plant populations) of lower than 4 plants per foot of row require less nitrogen. Onion stands reduced as a result of poor emergence or inclement weather will require less fertilizer N.

The amount of N fertilizer required depends on the nitrogen carry-over from the previous crop and the amount and type of residue to be plowed under.

N Fertilizer Guide Based on Soil Test

The amount of residual N in the soil varies considerably. A soil test for nitrate-N ($\text{NO}_3\text{-N}$) helps in evaluating the N carry-over from the previous crops in the case of mineral soils with organic matter content below 2%.

Soil samples for $\text{NO}_3\text{-N}$ should be taken in the spring prior to the application of N fertilizer.

Soil samples should be taken from the 0-12" soil depth.

OSU soil test results for N are reported in ppm. One ppm N in a 12" depth of soil equals about 4 lb N/acre.



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The total NO₃-N soil test values are used to estimate the N fertilizer requirement as indicated in the following table:

<u>NO₃-N Soil test (ppm) (in 12" depth)</u>	<u>N application (lb/A)^{1/}</u>
0	280
10	240
20	200
30	160
over 30	150

^{1/}These application rates are suggested for silt loam, loam, and clay loam soils. For sandy soils the application rates should be increased by 40 lb N/A.

When straw is incorporated after Sept. 1, increase N fertilizer rate by 30-50 lb/A.

PHOSPHORUS (P)

Onions require relatively high levels of available P. The P soil test is based on P present in the surface soil (0-12").

P should be banded. The fertilizer band should be located 2" to the side and below the seed.

<u>If the OSU soil test for P reads (ppm):</u>	<u>Apply this amount of phosphate (P₂O₅) (lb/A):</u>
0-5	170-200
5-10	140-170
10-15	110-140
15-20	80-110
Over 20	50-80

POTASSIUM (K)

Onions require medium levels of available soil potassium. The K soil test is based on K present in the surface soil (0-12").

<u>If the OSU soil test for K reads (ppm):</u>	<u>Apply this amount of potash (K₂O) (lbs/A)</u>
0-100	150-200
100-200	100-150
200-350	50-100
Over 350	0-50

SULFUR (S)

Onions require relatively high levels of available S. S fertilizer requirements will vary with soil texture, leaching losses, and S content of the soil.

S is frequently contained in fertilizers used to supply other nutrients such as N, P, and K and may be present in irrigation water, which can be tested for S content.

Plants absorb S in the form of sulfate. Fertilizer materials supply S in the form of sulfate and elemental S. Elemental S must convert to sulfate in the soil before the S becomes available to plants. The conversion of elemental S to sulfate is usually rapid for fine ground (less than 40 mesh) material in warm, moist soil.

Elemental S should be applied the year preceding the crop using finely ground material. A soil test for SO₄-S is not recommended if elemental S was applied the preceding year.

If S levels in the soil are not known, apply 40-60 lbs S/A.

<u>If OSU soil test for SO₄-S in the 0-12" soil depth reads (ppm):</u>	<u>Apply this amount^{1/} of S (lb/A)</u>
0-5	40-60
5-10	20-40
10-15	0-20
Over 15	0

^{1/}These application rates are suggested for loam soils. For sandy soils the application rates should be increased by 20 lbs S/A.

Elemental S is a strong acidifier. S in the sulfate form can be applied at planting time.

ZINC (Zn)

An application of Zn is suggested when the Zn soil test value is below 0.8 ppm.

Where Zn is required, either 10 lb/A of Zn should be broadcast and worked into the soil prior to planting or 3-4 lb/A of Zn should be banded with the fertilizer at planting time. An application of 10 lb Zn/A should supply Zn needs for 2 or 3 years.

To correct Zn deficiency during the growing season thoroughly wet plants with a solution containing 1 lb Zn in 50-100 gal of water.

Banding an acidifying fertilizer such as ammonium sulfate can reduce Zn deficiency. Zn deficiency is most likely to occur on calcareous soils where land leveling has exposed a calcareous subsoil.

OTHER NUTRIENTS

Responses of onions to other nutrients and lime have not been observed on mineral soils in eastern Oregon.

N, P, K, S, and Zn recommendations are based on soil test values from the Soil Testing Laboratory, OSU, Corvallis, Oregon.

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