



IRRIGATED POTATOES (Eastern Oregon--East of Cascades)

In potato production, both quality and yield are of importance. Potato quality is primarily a function of management factors such as proper irrigation and insect, weed, and disease control. Fertilizer applications affect the specific gravity, size, and smoothness of tubers. This fertilizer guide assumes good management.

NITROGEN (N)

Potatoes respond markedly to N applications throughout Eastern Oregon.

Of the suggested N application, 60 to 100 lbs N/A should be banded at planting time. The urea form of N may cause seedling injury if banded at planting. The remainder of the N should be plowed down, injected, applied through the sprinkler system, or side-dressed.

The amount of N fertilizer required depends on the following factors: kind of crop (short or long season); the preceding crop; the N carryover from the previous crop; the plant population; the amount and type of residue to be plowed under; and possible leaching losses due to over-irrigation.

The following fertilizer guides are for mineral soils.

N Fertilizer Guide Based On Previous Crop

Previous Crop	N Application (lbs/A)	
	Short Season Crop	Long Season Crop (Hermiston)
Grass Seed & Grain	200-250 (1)	150-350 (2)
New Land	125-175	150-200
Row Crops & Alfalfa	100-150 (3)	100-200
Mint	75-100 (3)	100-200

- (1) 150-200 suggested in Hermiston area.
- (2) 150-250 suggested in Hermiston area.
- (3) In Central Oregon about 200 lbs N/A is often applied following Mint or Potatoes.

The amount of residual N in the soil varies considerably. High amounts of residual N are often present following such crops as mint and onions.

Fertilizer Guide Based On Soil Test

A soil test for nitrate-nitrogen helps in evaluating the carryover from the previous crops in the case of mineral soils with low organic matter content in Eastern Oregon.

Nitrogen soil tests are of limited value following alfalfa.

Soil samples should be taken from the 0-12" and 12"-24" depths.

Soil samples for soil test N should be taken following a growing season and prior to the application of N fertilizer.

The soil test values in the following table represent the sum of the nitrate-nitrogen values in the two soil layers which were sampled.

Total OSU Soil Test N (ppm (to 24" deep))	N Application (lbs/A) (1)	
	Short Season Crop	Long Season Crop (2)
0-16	200-250	300-350
17-25	150-200	250-300
26-40	100-150	200-250
40-60	60-100	100-200
Over 60	60	60-100

- (1) Add 20 lbs N for each ton of grain, straw or non-legume residue plowed down after Sept. 15.
- (2) Reduce N ratio by 1/3 in Hermiston area.

PHOSPHORUS (P)

Potatoes usually respond to applications of P. The rate of applying P is based on a soil test on surface soil usually taken to plow depth.

P should be banded at planting time. P bands should be located about 2 to 3 inches to one or both sides of the seed.

If OSU Soil Test for P reads: (ppm)	Apply this amount (lbs/A) (1)	
	$P_{205} \times 0.44 = P$	
0-5	150-200	66-88
5-10	100-150	44-66
10-20	80-100	35-44
Over 20	80	35

The P content of fertilizer is expressed as the oxide (P₂O₅) on fertilizer labels. Multiply P₂O₅ by 0.44 to convert to P.

- (1) In *Central Oregon* at least 150 lbs P₂O₅/A should be banded.

Plow down applications of P are not as effective as band applications. For plow down applications the rate of P application should be increased by 50 percent.

POTASSIUM (K)

Potatoes require high levels of available K.

Many soils in Eastern Oregon contain adequate available K for potato production.

K is most effective if banded at planting time. K₂O applications in excess of 100 lbs/A should be plowed down or side-dressed 6" to 10" from row after planting. On some coarse sandy soils K is applied as a broadcast application.

The K soil test is run on a surface soil sample usually taken to plow depth.

If OSU Soil Test For K reads: (ppm)	Apply this amount (lbs/A)	K ₂ O x 0.83 = K
0-200	200-400	166-249
200-300	100-200	83-166
300-400	0-100	0-83
Over 400	0	0

The K content of fertilizer is expressed as the oxide (K₂O) on fertilizer labels. Multiply K₂O by 0.83 to convert to K.

SULPHUR (S)

S requirements will vary with soil texture, leaching losses, and the soil parent material. Soils developed on pumice in Central Oregon have a particularly high S requirement.

1. In *Central Oregon and the Hermiston area*, 80 to 100 lbs S/A should be applied annually to the coarse sandy loam and loamy sand soils.
2. In *Central Oregon*, 40 to 60 lbs S/A should be applied annually to the silt loam and finer-textured soils.
3. In *North Central, South Central, and Northeast Oregon*, 25-40 lbs S/A should be applied on an annual basis.
4. S response has not been measured on some soils, such as the river bottom soils in Crook County and Malheur or Harney Counties.
5. S is frequently contained in fertilizers used to supply other nutrients such as N, P, and K.

ZINC (Zn)

Responses of potatoes to Zn in Eastern Oregon have been reported on flat areas of leveled fields where calcareous subsoils have been exposed.

Where Zn deficiency is anticipated: broadcast and plow or disc 10 lbs Zn/A or

3 to 4 lbs Zn/A can be included with the N banded at planting.

MAGNESIUM, LIME, AND OTHER MICRONUTRIENTS

Potatoes have responded to:

Copper and manganese on muck soils in the *Klamath Falls area*.

Zinc and manganese on sandy soils in the *Umatilla area*.

Otherwise responses to micronutrients, magnesium, and lime have not been observed.

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

This fertilizer guide is based on experiments conducted by Malcolm Johnson, George Carter, Neil Hoffman, Luther Fitch, and T. L. Jackson, Oregon Agricultural Experiment Station, and on experience in growers fields.

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