

Fertilizer Guide

FG 40
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IRRIGATED WHEAT (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, proper seeding methods, and timely harvest.

It is important that the soil be sampled and tested as a guide to fertilization. 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 and soil sample bags and information sheets.

NITROGEN (N)

Irrigated grain requires a good supply of available N; however, excessive rates of N can reduce grain quality and increase the risk of lodging. An optimum response to N fertilization depends on adequate irrigation.

Of the suggested N application, 0 to 40% of the N should be applied preplant or at planting time and the remainder during tillering in the spring. The urea or diammonium phosphate forms of N may cause seedling injury if banded close to the seed at planting.

The amount of N fertilizer required depends on the following factors: the preceding crop, the N carryover from the previous crop, 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 with low organic matter content unless otherwise stated.

N Fertilizer Guide Based on Soil Test

The amount of residual N in the soil varies considerably.

A soil test for nitrate-N (NO₃-N) helps in evaluating the N carryover from the previous crops in the case of mineral soils with low organic matter content.

N soil tests are not recommended following alfalfa (or other legumes) or for muck and peat soils.

Soil samples for NO₃-N should be taken following a growing season and prior to the application of N fertilizer.

Soil samples should be taken from the 0-2 ft and 2-6 ft soil depths on deep soils. The soil samples should consist of soil cores removed from the entire 0-2' and 2-6' depth of soil. On soils shallower than 6', soil samples should be taken from 0-2' and from 2' to the rooting depth.

OSU soil test results for N are reported in ppm. One ppm N in a 1' depth of soil equals about 4 lbs N/A. As an example:

Soil depth (ft)	Soil test NO ₃ -N	
	ppm	lbs/A
0 - 2	4	32
2 - 6	3	48
		Total = 80

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

NO ₃ -N soil test lbs/A	N application* lbs/A
0 - 50	250 - 200
50 - 100	200 - 150
100 - 150	150 - 100
150 - 200	100 - 50
200 - 250	50 - 0
Over 250	None

*These application rates are calculated for an estimated yield of 100 bu/A. Add or subtract 3 lbs N/A for each bu/A when estimated yield is above or below 100 bu/A.

Should the soil test value for NO₃-N be less than 2 ppm in the 0-2' soil depth apply a minimum of 30 lbs/A N when well-tillered wheat plants are not present regardless of the soil test value for N below 2'. This application is to insure adequate initial growth of wheat plants.



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N Fertilizer Guide Based on Previous Crop

Where a soil test is not used, N fertilization would be based on the preceding crop.

As the amount of residual N in the soil varies considerably, a soil test is usually the most accurate method of estimating N fertilizer needs except following a legume crop.

<u>Previous crop</u>	<u>N application (lbs/A)*</u>
Grass sod	200 - 250
Grain	175 - 225
Potatoes or peppermint	150 - 200
Productive alfalfa	125 - 175

*These application rates are based on an estimated yield of 100 bu/A.

PHOSPHORUS (P)

Best results are obtained when P is banded 2" to the side or below the seed at planting time. Plowing P down before planting is preferable to broadcast applications.

<u>For mineral soils:</u>	<u>Apply this amount of*</u>	
	<u>phosphate (P₂O₅) (lb/A):</u>	
<u>If the OSU soil test</u>	<u>Central Ore.</u>	<u>Remainder</u>
<u>for P reads (ppm):</u>	<u>& Klamath Co.</u>	<u>of E. Ore.</u>
0 - 12	60	30
12 - 20	30	0
Over 20	0	0

*The application rate should be increased by 50% if P is not banded.

On muck soils in the Klamath area apply 40 lbs P₂O₅/A.

POTASSIUM (K)

K fertilizers usually are not required for production of irrigated spring planted small grain in eastern Oregon, but K responses may be obtained when OSU soil test values for mineral soils for K are less than 100 ppm. In this case 30 to 50 lbs K₂O/A should be banded at least 2" from the seed at planting or plowed down prior to planting.

On the acid muck soils in Klamath County, small grains have responded to the application of K.

SULFUR (S)

S requirements vary with soil texture, leaching losses, and the soil parent material. 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 is a strong soil acidifier.

S in the sulfate form can be applied at planting time.

<u>If OSU soil test for</u>	<u>Apply this amount of S*</u>	
<u>SO₄-S in 0-2' soil</u>	<u>Loamy soil</u>	<u>Sandy soil</u>
<u>depth reads (ppm):</u>	<u>(lbs/A)</u>	
0 - 3	0 - 20	20 - 40
3 - 5	0	0 - 20
Over 5	0	0

*When the irrigation water contains over 2 ppm of S, additional S fertilizer is probably not required.

MAGNESIUM (Mg)

Responses of small grains to applications of Mg have not been observed on mineral soils in eastern Oregon.

LIME

Responses of wheat to lime have not been observed in eastern Oregon; however, where the soil test pH value is less than 5.5 a lime application is suggested.

On sandy soils where soil acidity is most prevalent, one ton of 100-score lime raises the pH about 1 unit. In most instances 1 to 1½ tons lime/A is adequate to correct soil acidity.

Lime should be mixed into the seedbed at least several weeks before seeding. A lime application is effective over several years.

MICRONUTRIENT ELEMENTS

In the Klamath area, a micronutrient mix containing zinc, copper, and manganese has given yield responses with small grains on muck soils.

MANURE

Manure can be used as a source of nutrients for small grains. Information on the use of manure is available from your county agent.

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

Guide to fertilization based on experiments conducted by Malcolm Johnson, Vance Pumphrey, and T. L. Jackson, Oregon Agricultural Experiment Station; Bert G. Wilcox, OSU Extension Service; and observation of growers' results.

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