Over 50 fertilizer experiments on winter wheat have been conducted in Baker, Union, and Wallowa counties since 1957. Results of these experiments indicate that nitrogen and moisture are the main factors limiting wheat production in this area.

Nitrogen

Early spring applications of nitrogen have proved to be more effective in increasing yields than applications of nitrogen made in the fall before planting. Straw height and lodging have been less from spring-applied nitrogen than fall-applied nitrogen. Spring applications of nitrogen can be made any time from prior to the start of spring growth until the wheat is 6 to 10 inches in height. The following guides are suggested for spring-applied nitrogen fertilizer.

1. Winter wheat planted on summer fallow land-- Apply 30 to 60 lbs. of actual nitrogen (N)/A.

2. Recropped wheat on nonirrigated, deep soils or irrigated land or where large quantities of straw have been turned under-- Apply 60 to 90 lbs. of actual nitrogen (N)/A.

3. Wheat following a forage legume crop-- No nitrogen is needed.

4. Wheat grown on shallow soils without irrigation-- Nitrogen needed only in years when rainfall exceeds normal and is well distributed throughout the growing season.

Phosphorus

Most soils in northeastern Oregon supply adequate amounts of phosphorus for maximum yields of winter wheat. Only one area has been found consistently to respond to phosphorus fertilization. This area is centered around Wingville in Baker County but extends northward into southern Union County. Soils mapped as Wingville and Baldock series will need phosphorus if they have not been fertilized with phosphorus for legume production. Guides are suggested for phosphorus fertilization on these soils.

1. When soil test values are less than 15 lbs. of phosphorus (P)/A-- Apply 20 to 40 lbs. of phosphate (P$_2$O$_5$)/A.

2. When soil test values are above 15 lbs. of phosphorus (P)/A-- No phosphate fertilizer is needed.
Apply phosphorus prior to or during planting. Banding phosphorus in the root zone is superior to broadcasting.

Sulfur

Deficiency symptoms of nitrogen and sulfur are nearly identical. Plants are light green to yellowish green in color and grow slowly. Sulfur deficiency should be suspected from plant symptoms only after it is known that an adequate nitrogen application has been made. Sulfur deficiency in wheat has been observed only where nitrogen fertilizer has been applied.

For soils that need sulfur, 15 to 25 lbs. per acre applied at planting time or in the early spring is adequate to offset the deficiency. Sulfur fertilizers applied in the spring should contain sulfur in a sulfate form.

Sulfur requirement can usually be satisfied by using nitrogen-phosphorus fertilizer materials that contain sulfur. Polysulfides can be added to most gaseous and liquid nitrogen materials.

Other Plant Nutrients

Winter wheat has not shown response to application of other fertilizer materials in experiments where they have been tested.

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