Nitrogen Requirements

SEASONAL

Nitrogen is best applied to wheat in split applications because large quantities of preplant N may be leached or denitrified during the winter.

Preplant and early-season N should be applied to achieve yield goals, while a late-season N application is often needed to achieve the required grain protein content.

Soil Sampling

Sampling close to planting or shortly before the first top-dress application is recommended to determine available soil nitrate-N. Residual soil nitrate can contribute an additional 30-80 lbs N/ac. Residual nitrate can also be higher following alfalfa or a vegetable crop, so consider previous crops in the N budget.

Plant Analysis

The nutrient status of wheat can be determined by analyzing leaves or stems. However, N fertilization decisions should not be based on plant analyses alone.

The N status of wheat is also reflected in the leaf color, with light green leaves indicating low N availability and dark green leaves indicating N-sufficient plants. The leaf greenness of wheat plants can be determined using hand-held devices. Leaf greenness readings are best when compared to a well-fertilized strip in the same field.

SELECTED REFERENCES


Nitrogen Fertilization

**TOPDRESS Application Timing**

The rate of N uptake is highest between stem elongation and early heading. During this period, approximately 60% of the total N is taken up, making the tillering stage the most efficient period to apply N fertilizer.

An application of 30-60 lbs N/acre, between boot and flowering, has been found to increase grain protein content.

**Application Rates**

There is a range of wheat varieties in California, and therefore there is a range of appropriate N rates. For an average yielding crop (5500-6000 lb/acre), studies have found that a total N application rate of 150-200 lbs is sufficient to match crop uptake.

**Application Mode**

When N fertilizer is broadcast, it needs to be applied before irrigation or rainfall to incorporate the N into the soil. Moisture is important after the application of urea or UAN. Without moisture, the hydrolysis of urea by urease increases soil pH, which can result in ammonia volatilization when the material is left on the surface.

**Foliar Applications**

When N availability in the root zone is limited, foliar N applications before flag leaf emergence may increase grain yield, while applications at flowering or during the following two weeks may increase grain protein content. Foliar application of N, particularly in warm temperatures (>80°F), may damage the leaves, resulting in a discoloration of leaf tips. Water-run applications of N can reduce this risk.

For more information and references about N management in wheat, access the Crop Fertilization Guidelines at: www.cdfa.ca.gov/go/FREPguide