

Timing Fertilizer Application is Critical for Optimum Nutrient Uptake

Summary: A new Montana State University Extension publication explains timing fertilizer application to optimize crop yield and quality.

9/4/09 Contact: Clain Jones (406) 994-6076 or clainj@montana.edu

To: News-dailies, News-weeklies, AgMedia, News-local, News-tv, News-radio, MSU-All-News, News-internal, NatResourcesNonmedia, Producers, Web. From Sara Adlington, (406)994-4602

Filename: **NutrientUptake**

Web: Ag, Extension

Database: University/College of Agriculture, LRES, Extension

From MSU News Service

BOZEMAN -- The timing of nutrient uptake in Montana and Northern Great Plains crops is explained in the new MSU Extension bulletin, 'Nutrient Uptake Timing by Crops: to Assist with Fertilizing Decisions.'

"With the volatility in fertilizer prices and increasing environmental awareness, it is important that applied fertilizer ends up in the plant," said author Clain Jones, Extension soil fertility specialist in the Department of Land Resources and Environmental Sciences at Montana State University.

If nitrogen fertilizer sits on or in the soil long before plant uptake, there is potential for nitrogen loss to air, groundwater, or tie-up by bacteria and fungi. These losses are a direct financial loss to the producer, may decrease yields, and may have negative environmental and health effects. "The closer fertilizer application can be timed to maximum plant uptake, the smaller these potential losses are to the producer," said Jones.

Split fertilizer applications allow nutrient management to be adjusted for the current year yield potential and can reduce losses.

"Timing the application so nutrients are available prior to maximum nutrient demands, which come before plants reach their maximum size, is critical," said Jones. The second of split applications on small grains should be applied prior to early tillering, though actual timing will depend on a variety of factors including soil nutrient levels and starter fertilizer amounts. In oilseed crops, the optimal time for supplemental in-season fertilization would be before or during branching.

"Because timing of spring fertilizer applications should ideally be based on plant growth stage, rather than calendar date, the optimal date of a second application, or top dressing, will vary with the crop and year" said Jones. In crops started later in the spring, such as potato, sugar beet and corn, top dressing would occur later in the season. A cooler spring will also delay timing of a second application due to delayed growth and nutrient uptake. Regardless of the crop and year, adequate nutrients are necessary early in growth for maximum production and to ensure that especially nitrogen and phosphorus are available for good grain or seed fill.

Wheat plants take up approximately 70 percent of their necessary nitrogen and phosphorus by early heading. Over 50 percent of the nitrogen and phosphorus used for grain fill comes from the stem, leaves, and head of the plant, rather than directly from the soil.

“If the nutrients are not available for early plant growth, then yield may be compromised, and efficiency of fertilizer use is reduced. Both are financial losses to producers,” said Jones. However, applying nitrogen fertilizer too early, for example in early fall when the soil is still warm and active, can also cause fertilizer loss. With “enhanced efficiency fertilizers,” which can release their nutrients gradually, nutrient availability may more closely match plant uptake, and potential nutrient loss is reduced. More details on crop nutrient uptake curves and timing of fertilizer applications are described in the new 'Nutrient Uptake Timing by Crops' bulletin.

For copies of the Extension bulletin, please refer to the Web at <http://msuextension.org/publications/agandnaturalresources/EB0191.pdf>. To find other Extension publications, including one on Enhanced Efficiency Fertilizers, and for ordering information, visit <http://msuextension.org/publications.asp>, or call Extension Publications at (406) 994-3273.