



Fall Fertilization

Many indicators are pointing to the growing need for more food, more feed and even more fuel. Food is needed for a growing world population, estimated at 75+ million more people each year. More feed is needed for the livestock and poultry industries. More fuel, as ethanol and biodiesel, is needed from corn, oilseeds and/or high cellulose crops. These needs signal the vital role of the American Farmer and Agribusiness to provide essential crop production inputs such as fertilizer.

Profitability for both groups relate to improving crop yields to help lower the unit cost of production. It also relates to getting each and every job done right and on time. And, this fall is the right time to make nutrient management decisions and fertilizer applications to certain fields.

FALL FERTILIZATION ... A SOUND AGRONOMIC PRACTICE

The decision regarding whether or not to apply fertilizer this fall depends upon several conditions. Some are financial while others are agronomic in nature. Consider the following:

- The economics of fertilizer use have improved during recent months for many farmers
- High crop yields during 2009 are expected which will remove large amounts of nutrients from fields
- Some growers backed off from normal fertilizer rates this past season resulting in fields in need of a sound fertilizer program for the 2010 season to maintain yields.
- Medium and low testing soils are most responsive to applied nutrients and should be high priority fields for fall fertilizer application.
- Fields differ in suitability for fall fertilization. Slope, residue cover, and other such features deserve special consideration.

Fall fertilization is an opportunity to restore soil fertility levels needed for top-profit cropping systems for many fields. It can be an excellent management practice for the following:

- *Fall planted small grain crops.* Fertilizer jump-starts seedlings for rapid canopy closure, soil protection from erosion, and high yield fall tillering.
- *Cover crops.* They provide soil cover to minimize erosion, improve water infiltration, provide feed for fall/winter livestock grazing, capture unused previous crop nutrients, provide residue for soil quality, and release nutrients as the cover crop residue decomposes. Unless properly fertilized, cover crops will not achieve their full potential.

- *Pastures, both grass and legumes.* They can provide winter/early spring feed for livestock, help plants cope with winter temperature/moisture stresses, and allow for rapid plant growth the following spring.
- *Forage crops, like alfalfa and bermudagrass.* Fall fertilization builds plant root reserves and winter hardiness. Removal of nutrients from the field in harvested hay must be replaced to maintain high production, feed quality, and to extend the longevity of the stand. Each ton of hay removes from the field approximately 12-15 pounds of P₂O₅, 50-60 pounds of K₂O and 5-6 pounds of sulfur and magnesium.
- *Winter vegetables and fruit crops, such as cabbage or onions.* Specialty crops often require special nutrients, such as sulfur and/or magnesium.
- *Crops to be early planted next spring.* The decision to apply fertilizer in the fall allows more time to hit a narrow spring planting window essential for high-yield, such as with corn.

GUIDELINES FOR SELECTING FIELDS TO BE FALL FERTILIZED

Not all fields should be fall fertilized. The following “guidelines” might help to identify those fields suitable for fall fertilization.

- Select fields with good residue cover and less than 3-5 percent slope.
- Sandy, low cation exchange capacity soils subject to nutrient leaching are less suited to fall nutrient applications.
- Consider fields with a high risk of wet-soil compaction in the spring
- Level fields with good residue and light snow cover are suitable.
- Target those nutrient hungry, high fertilizer responsive fields. They often show a medium-low soil test, are to be planted early to crops like corn or are in established perennial crops like alfalfa and that are not subject of erosion and/or surface loss of applied nutrients.

SOIL TEST FIELDS PRIOR TO FALL FERTILIZATION

A part of a crop’s nutrient requirements are supplied from soil reserves with the remainder coming from applied fertilizer. Phosphate, potash, magnesium and sulfur can be fall applied with minimal concern about reduced crop use efficiency or loss by leaching.

Few labs routinely soil test for nitrogen or sulfur. When nitrogen is fall applied, the soil temperature following application deserves attention. Nitrification of ammonia declines to tolerable levels when soil temperature remains below 50 degrees F. Nitrogen stabilization products have proven effective in keeping N losses down.

CROP SULFUR NEEDS CAN BE FALL APPLIED

Stack scrubbing and other clean air practices are resulting in less sulfur deposited on cropland fields. University specialists report that sulfur shortages are becoming more widespread across the Midwest. In some states a reduction of 15 or more pounds of sulfur per acre per year has been reported. An additional reduction in available sulfur is believed due to the heavy rainfall during the past crop season. Also, this year’s high crop yields result

in added sulfur leaving the field. These factors result in lower soil sulfur reserves for next year's crop and a need to consider replacement fertilization.

CROP	YIELD	N	P ₂ O ₅	K ₂ O	Mg	S
		----- pounds/acre -----				
Alfalfa	8 tons/a	450*	96	480	40	40
Bermudagrass	8 tons/a	370	96	400	26	44
Cabbage	700 cwt/a	270	63	249	36	64
Corn-grain	180 bu/a	240	100	240	58	30
Corn Silage	32 tons/a	266	114	266	65	33
Cotton	1,500 lbs/a	240	72	210	32	36
Peanuts	4,000 lbs/a	240*	39	185	25	21
Soybeans	60 bu/a	324*	64	142	27	25
Wheat	80 bu/a	166	54	184	24	20

* Legumes derive most of the N from Symbiotic N fixation.

K-Mag is an excellent source of sulfate sulfur that is well suited to fall application. This source also provides both readily available potassium and magnesium. Since most soils are not tested for sulfur, specialists often suggest applying 80-90% of the crop's sulfur removal rate.

FALL APPLIED NUTRIENTS HAVE A BIG JOB TO DO

Plant nutrition is one component of a top-profit cropping system. Nitrogen, phosphorus, potassium, sulfur and other essential elements each have a vital role to play. They need to be in place prior to critical crop growth stages. For many fields, fall application is a sound management practice. Some of the vital functions for each nutrient are:

NITROGEN is essential for:

- Amino acid and protein formation
- Photosynthesis
- Efficient plant use of P, K and S
- Optimum root, shoot and grain development

PHOSPHORUS is essential for:

- A vigorous crop root system
- Capture and storage of sunlight energy during photosynthesis
- Energy transport to sites of root, shoot and seed development
- Photosynthesis

POTASSIUM is essential for:

- Optimum photosynthesis, respiration, plant water use
- Synthesis of amino acids and quality protein
- Activation and/or regulation of over 60 plant enzyme systems
- Improved N use efficiency and effectiveness

SULFUR is essential for:

- Formation of chlorophyll, enzymes, and vitamins
- Improved seed formation and protein synthesis
- Improved N use efficiency and effectiveness

- Enzyme activation for converting nitrates into amino acids

HIGH ANALYSIS NUTRIENT SOURCES

High analysis nutrient sources lead to high analysis blends and more acres fertilized per spreader truck load. Sources such as MAP, DAP, MES, MOP and K-Mag are particle size formulated to be blended together with a minimum of segregation during transport and field application. They allow the maximum storage of nutrients with a minimum of bins and bin space. They also, serve as excellent sources for direct application where needed.

NUTRIENT SOURCE	N	P ₂ O ₅	K ₂ O	Mg	S	% nutrients
Monoammonium Phosphate (MAP)	11	52				63
Diammonium Phosphate (DAP)	18	46				64
MicroEssentials SZ	12	40			10	62
Ammonium Sulfate	21			24		45
Muriate of Potash			60			60
Urea	46					46
K-Mag			22	11	22	55

FALL FERTILIZATION PAYS IN MANY WAYS

Fall fertilization remains agronomically sound for many cropping situations. Establishing the best fertilizer nutrient sources and rates of application will be crop, nutrient and site specific. This fall is a good time to resupply the soil's nutrient reservoir. The best team to do this job is the farmer and crop/soil advisers, such as the extension service specialist or the fertilizer supplier's certified crop advisor. Some of the fall fertilization opportunities include:

FARMERS

- Essential nutrients are in place
- Soil compaction risk is less
- Timely delivery/application of nutrients
- Enhanced crop performance

FERTILIZER PROVIDER

- Spreads the workload
- Better use of equipment and labor
- Efficient use of storage space
- Inventory stability

Fall is an excellent time to recharge the soil's nutrient reservoir. It allows essential nutrients like P, K, S, Mg, and Zn to be put in place and ready for crop absorption next year. It can be beneficial to both farmers and their fertilizer provider. It serves to put into place a part of a crop's nutrient requirements essential for top-profit crop production during the 2010 season.

