



Northeast Missouri Ag Connection

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Grow Your Own Nitrogen Fertilizer

Fertilizer expense can account for half of the cost of producing forages. One way to reduce the commercial fertilizer requirement is to add legumes such as red clover, alfalfa, birdsfoot trefoil or lespedeza to pastures and hay fields. Legumes have the ability to produce 300 pounds of nitrogen annually. This happens when a nitrogen fixing bacteria infests the roots of legume plants. The plant provides the bacteria with a home and nutrients and the bacteria provide nitrogen to the legume plant.

The legumes use the nitrogen for their own growth and releasing approximately 20 percent of the fixed nitrogen into the soil which can be utilized by grass growing with the legume. Generally a stand with at least 30 percent legume will produce enough nitrogen to eliminate the need for additional nitrogen fertilizer.

The key to successful legume establishment begins with an adequate fertility level for the legume to be planted. Alfalfa requires high phosphorus and potassium soil test levels and a soil pH of 6.5. Red clover performs best in a soil with medium to high phosphorus and potassium soil test levels and a soil pH of 6.0. Birdsfoot trefoil and lespedeza can tolerate low fertility levels and lower soil pH. Choose the legume best suited for current soil conditions or plan to add the fertilizer and lime needed to maintain the chosen legume.

Most legumes can be planted in the fall. Lespedeza should only be planted in the spring since it is an annual plant. Birdsfoot trefoil and the clovers (red, white and alsike) can be seeded in late summer or early fall. The best time for fall seeding of alfalfa is September and both hairy and crownvetch can be planted during late fall.

It is important to inoculate the seed at planting with the proper bacteria to ensure the legume plant will produce nitrogen. The strain of rhizobium bacteria needed is different for each species of legume. Because the bacteria are living organisms, care should be taken to keep the bacteria from getting too warm. Store in a cool place until ready to plant, and keep it in a cooler if temperatures are warm on seeding day.

The optimum seeding depth for most legumes is one quarter inch. Drilling too shallow is better than drilling too deep. Recommended seeding rates are four pounds per acre for red clover, six pounds per acre for birdsfoot trefoil and 10 pounds per acre for alfalfa. Do not apply nitrogen fertilizer when seeding legumes, because this gives grasses a competitive advantage increasing the risk of failure of the legume seeding.

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In addition to reducing the need for commercial nitrogen fertilizer, the quality of feed is improved since legumes are generally higher in protein than grasses. This is particularly beneficial when the companion grass is endophyte infected tall fescue, as it helps to dilute the endophyte level in the animal's diet. Legumes begin growing in late spring and continue to grow later into the summer than cool season grasses, providing forage for grazing during the warmer summer months and/or increasing tonnage of hay produced.

Source: *Valerie Tate, Agronomy Specialist*

Rain, Humidity Causing Diseases in Lawns and Gardens This Summer

Due to the abundant rain and humidity, disease is prevalent in fruits, vegetables and lawns this growing season. Brown patch, a fungal disease of lawns has erupted throughout Missouri due to high temperatures and lots of moisture. These conditions have been perfect for fungal growth this year which has caused numerous other diseases like brown rot in peaches, black rot in grapes, septoria leaf spot on tomatoes, cedar-apple rust on apples and crabapples, fireblight on pears and apples, leaf spots on strawberries, and foliar diseases like alternaria and anthracnose in cucurbits (cucumber, pumpkins, melons). Water wilt in tomatoes and other vegetables has also been reported this season along with nutrient deficiencies.

Yellowing of grass which then turns brown and spreads throughout, possibly even creating brown rings is a disease called brown patch. Brown patch is a fungal disease of turfgrass loving two things: heat and moisture. Development of brown patch was noticed in mid-June and could continue throughout the summer with high moisture and humidity.

As the name implies, it shows up as a patch of grass that has turned brown. According to Brad Fresenburg, state turfgrass specialist with University of Missouri Extension, the biggest mistake often made by homeowners is adding water or fertilizer in hopes of improving those brown patches. This mistake actually feeds the disease. Brown patch, which is caused by the plant pathogenic fungus *Rhizoctonia solani*, is considered a summer disease because it spreads rapidly in the heat. Dr. Lee Miller, turfgrass

pathologist, refers to the 6-8 Flip-Flop rule. This rule is the combination of a temperature of 86 degrees or higher during the day and 68 degrees or higher at night. These conditions can encourage brown patch. So before you drag out the bag of fertilizer or the garden hose, take a close look at your grass.

Brown patch symptoms may include brown lesions on the margins of the leaf blade or in the center. The lesions usually are straw- or tan-colored with a dark margin. For positive identification submit a sample to your local MU Extension office or the University of Missouri Plant Diagnostic Clinic. Quick identification is important because brown patch will continue to spread throughout the growing season unless it stops getting moisture. Brown patch will usually subside with drier conditions, especially with drought conditions when the grass goes dormant. Be cautious as watering during dry conditions could prolong the disease.

There are treatments available through professional lawn care services. Though in some rural communities lawn care services may not be available. The next best thing is to buy a bag of Scotts Lawn Fungus Control. The active ingredient is Thiophanate-methyl. Apply it according to label directions. To prevent further spread of the disease, avoid walking on a lawn when it is wet. Wait to mow until the grass has dried out and do not leave grass clippings on the lawn. Rake them up immediately.

For other fungal plant diseases, use a product containing 'chorothalonil' between rains to help prevent the spread of the disease. If tomato, bean or other vegetables are showing signs of water wilt, pull back the straw mulch to allow more air to dry out the soil.

Often tomatoes and green beans with water wilt do not recover. Leaching of soil nutrients and yellowing of plants is also caused by too much rain. Fertilizer plants to replenish nutrients. Hopefully, next season will be more productive.

SOURCE: Parts of this article on Brown Patch were written by Debbie Johnson, writer for University of Missouri Extension with Dr. Brad Fresenberg, turf specialist, as the story source.

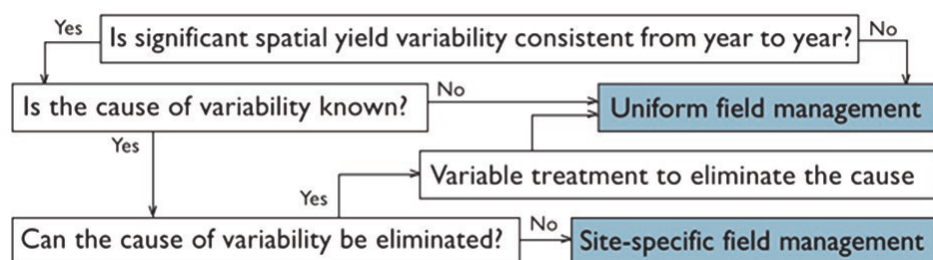
Source: *Jennifer Schutter, Horticulture Specialist*

Yield Mapping – A Useful Tool in a Challenging Year Too

Yield monitoring equipment was introduced in the early 1990s and is increasingly considered a conventional practice in modern agriculture. Yield mapping refers to the process of collecting georeferenced data on crop yield and characteristics, such as moisture content, while the crop is being harvested.

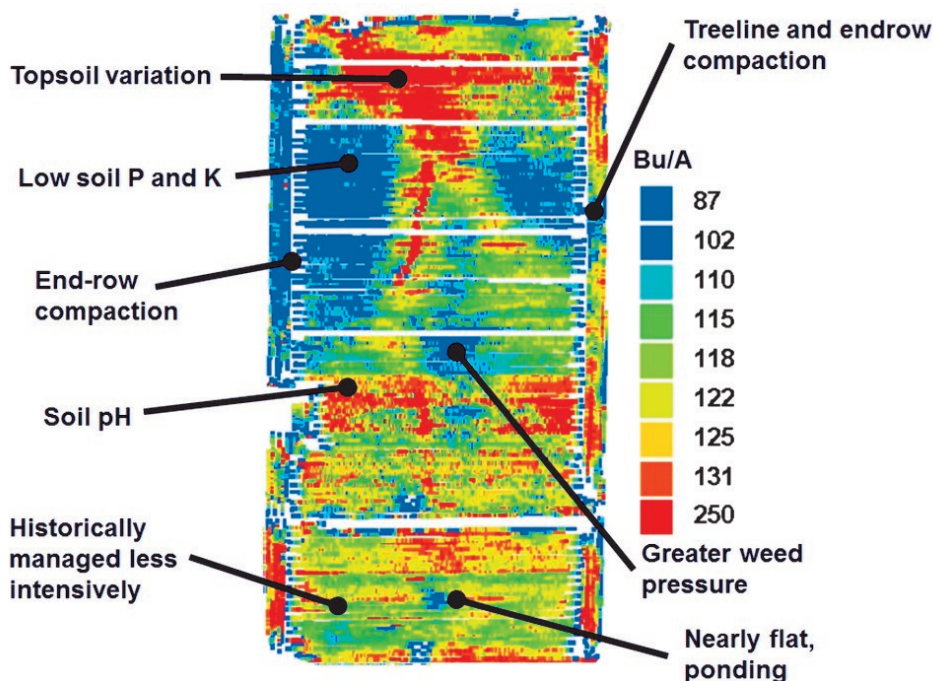
Yield maps represent the output of crop production. Current year's information can be used to investigate the existence of spatially variable yield limiting factors. Yield maps from multiple years can provide a yield history to define spatially variable yield goals that may allow varying inputs according to expected field productivity.

The following flowchart illustrates the process one



might follow in deciding whether to invest in site-specific crop management, based on the analysis of yield maps. If yield variability across the field cannot be explained by any spatially inconsistent field property (e.g. nutrient supply, topography, past management, etc.), uniform management may be appropriate. Site-specific management becomes a promising strategy if yield patterns are consistent from year to year and can be correlated to one or more field properties.

If the causes for yield variation are known and can be eliminated permanently, the entire area could be brought to similar growing conditions and managed uniformly thereafter. This concept was one of the earliest philosophies behind precision agriculture, but is likely only feasible for certain field properties. For example, variable rate liming can be used to correct



Corn Grain Yield – USDA-ARS Research Site near Centralia, MO

acidic areas in a field. In this case, the yield map is used only to investigate whether low soil pH is a yield-limiting factor and prescribe variable application rates. Another example would be localized deep soil tillage to alleviate compaction in selected field areas.

Most yield limiting factors cannot be modified permanently through single measures because of economic or practical constraints. Consequently, site-specific crop management may be used to appropriately account for the

existing spatial variability in attainable yield and/or soil properties.

Yield maps are one of the most valuable sources of spatial data for precision agriculture. A long yield history is essential to avoid drawing conclusions that are affected by the weather or other unpredictable factors during a particular year. Typically, at least five years of yield maps are desired. Yield maps can be used to investigate factors affecting the yield or to prescribe variable rate applications of agricultural inputs according to spatially variable yield goals. Producers interested in site-specific management practices should always evaluate multiple approaches to identify those which provide the greatest benefit to a particular field.

Source: Kent Shannon, *Natural Resource Engineering Specialist*

Reduced-cost Farm Energy Audits Available through MU Extension

Are you thinking about replacing your grain dryer with a more energy-efficient model? Or installing an alternative-energy system? Having an energy audit conducted before making a big investment can help in determine the payback of potential energy upgrades.

Farms and rural small businesses can receive energy audits at a reduced rate through MU Extension. Ordinarily, audits cost \$450, but a grant from USDA Rural Development will cover 75 percent, lowering the price to \$112.50. An energy audit is also required if you intend to apply for incentives through USDA Rural Development's Rural Energy for America Program (REAP).

Grants are available for up to 25 percent of the cost of a renewable energy or energy efficiency project. REAP also provides loan guarantees for up to 75 percent of a project's cost. Eligible energy systems include solar, wind, geothermal, anaerobic digesters and renewable biomass. Energy efficiency improvements include grain drying and handling, lighting, refrigeration, heating and cooling upgrades, and motor replacements.

To be eligible, at least 50 percent of a farm's gross income must come from agricultural operations, and small businesses must be in an area with a population under 50,000.

For more information about MU Extension energy audits, contact your local University of Missouri Extension office. To learn more about REAP, go to <http://1.usa.gov/1FDL11W>.

Source: *Kent Shannon , Natural Resource Engineering Specialist*