

Integrated Pest & Crop Management

Should I apply fall N to pastures?

By John Lory, Rob Kallenbach and Justin Sexton

We are already well into the optimum nitrogen application window for Missouri pastures. Optimum application window for fall nitrogen in fescue pastures starts around August 1 and response to fall-applied nitrogen decreases incrementally after September 1.

High fertilizer prices have producers reconsidering all aspects of their forage fertilization program. Should I apply fall nitrogen? And if yes, what rate should I apply?

Average yield response to fall-applied nitrogen typically is less than response to spring-applied nitrogen and the fall response can be quite variable from year to year. The big unknown is the amount of fall rainfall. A favorable distribution of precipitation can lead to a large yield response. Unfortunately, you cannot know the how much rain we will get in fall when you need to apply fall nitrogen.

How much nitrogen should I apply? Research from Missouri and other states shows a positive response to rates of nitrogen over 100 lbs/acre when yields are averaged over multiple years. But the amount of response decreases at higher rates. Higher rates are also more likely to reduce legumes in mixed fescue-legume swards. A rate between 50 and 100 lbs nitrogen per acre is justified depending on how much you want to stake on having good fall rainfall with the lower rate favored on pastures you are trying to maintain a high legume component. Rates above 100 lbs/acre are likely to have lower yield response per unit of N applied.

If a pound of nitrogen increases yield 25 lbs and a pound of nitrogen costs \$0.75 then the nitrogen cost of the feed is \$0.03/lb (\$60/ton). Rob Kallenbach found 25 lbs fescue dry matter was the average response to 50 lbs N/acre in a four-year Missouri study on fall-applied nitrogen response in pastures.

The argument supporting fall nitrogen applications is the high quality and high utilization of properly managed stockpiled production. The ability to stockpile fall forage production and then strip graze it in late fall and winter insures most farmers will make good use of any increased yield in response to applied nitrogen. Rob Kallenbach has shown stockpiled fescue maintains quality through March while the toxic element in tall fescue (ergovaline) decreases by half by mid January

One alternative to feeding stockpiled grass is purchasing hay or other supplemental feeds. Purchase of supplemental feed has the added benefit of importing nutrients onto the farm. A ton of lower quality hay contains about \$30/ton of fertilizer nutrients at today's fertilizer prices and the value of high quality hay can exceed \$45/ton. To calculate these values we assumed fertilizer nitrogen cost \$0.75/lb N and 30% of nitrogen in hay is available as fertilizer; we also assumed phosphate fertilizer cost \$1.10/lb and potash fertilizer cost \$0.55/lb and 100% of the phosphate and potash in the hay is available as fertilizer. To insure hay nutrients have value on your farm you must commit to distributing manure nutrients around your paddocks through practices such as unrolling hay.

In our example, if you buy low quality hay for less than \$90/ton or high quality hay for less than \$105/ton you are saving money compared to buying fertilizer for early winter stockpiling of forage. The savings from purchasing hay include saving \$60/ton by not purchasing nitrogen fertilizer plus \$30 to \$45 in fertilizer value in the purchased hay in our example. The quality of the purchased hay, particularly low quality hay, will be less than stockpiled forage. If you are feeding well conditioned cows this may not be a problem. If you

Continued on page 95

Table of Contents

Should I apply fall N to pastures?

Page 91

Crop Disease Update- August 25, 2008

Page 92

Sudden Death Syndrome

Page 93

Soybean Aphid Numbers Increase in some Northern Missouri Counties

Page 94

Temporary Manure Piles

Page 95

Weather Data for the Week Ending August 25, 2008

Page 96



Field Crop Disease Update—August 25, 2008

By Laura Sweets

CORN

Foliage diseases of corn have been quite variable in incidence and severity this season. Some early planted fields are showing few symptoms of foliage disease while some late planted fields have high levels of foliage diseases, especially common rust.

Common rust of corn has been the most widespread and severe foliage disease of corn this season. Common rust pustules begin as small, circular, light green to yellow spots in the leaf tissue. These lesions develop into circular to elongate, golden-brown to reddish-brown raised pustules. The rust pustules may be in bands or concentrated patches on the leaf as a result of infection that occurred while the leaf was still in the whorl. As secondary infection occur on the same leaf or leaves above the initially infected leaf, rust pustules may be more randomly scattered across the leaf tissue. Common rust pustules rupture quickly to reveal masses of rusty brown spores. As the plants mature, the pustules become brownish black in color. Common rust pustules may develop on both upper and lower leaf surfaces as well as on leaf sheaths, husks and stalks. When rust is severe, leaves and leaf sheaths may yellow and die prematurely. This year the bands or concentrated patches of common rust on the ear leaf or leaves just below and above the ear leaf have been quite obvious.

Southern rust has not been very widespread or severe until the last 7 to 10 days. Now symptoms of southern rust are showing up in some fields. Initially southern rust lesions are small, circular, light green to yellow spots in the leaf tissue. These lesions develop into light orange to reddish-brown, circular to oval pustules. Eventually the pustules rupture to reveal masses of powdery spores; but the pustules remain covered longer than those of common rust. Southern rust pustules are found primarily on the upper leaf surfaces and less frequently on lower leaf surfaces. Pustules may also develop on husk leaves, ear shanks, stalks and leaf sheaths.

Neither the common rust nor the southern rust pathogens survive on infested residues left in the field. Rather infection during a growing season occurs as a result of spores that are blown in from more southern locations. The incidence and severity of both diseases during a given growing season depends in part on how early in the season rust inoculum reaches Missouri. Warm, humid or wet conditions favor the development of the rust diseases on corn.

Most commercial corn hybrids are fairly resistant to common rust. Resistance to southern rust is available but not as prevalent as resistance to common rust. Because the rust fungi do not survive in residues left in the field, crop rotation and residue management are not effective in preventing or reducing these diseases. Properly timed foliar fungicide applications may provide control of corn rust diseases but it

is important to apply fungicides before rust levels buildup too high.

Gray leaf spot has been reported from west central and northwest Missouri but has been hard to find in other areas of the state. If wet conditions continue, gray leaf spot may become a problem in later planted fields.

Stewart's wilt, the bacterial disease spread by the corn flea beetle, has been present in unusually low levels this season. Although this disease does not typically cause significant losses in commercial field corn, it is usually easy to find in corn fields throughout the state. This year it has been difficult to find lesions of the leaf blight phase of Stewart's bacterial wilt.

Diplodia ear rot has been reported from several fields already this season. From a distance infected plants may stand out because the ear leaf and husks on the ear might have a bleached or straw colored appearance. *Diplodia* ear rot is easily diagnosed when the husk is peeled back. Dense white to grayish white mold growth will be matted between the kernels (Figure 1) and between the ear and the husks. Small, black fungal fruiting bodies may be scattered on husks or embedded in cob tissues and kernels. The entire ear may be grayish-brown, shrunken and very lightweight. *Diplodia* ear rot would be favored by warm, wet or humid weather and tends to be more severe when corn follows corn.



Figure 1: Ear of corn with matted mold growth between kernels.

SOYBEAN

Sudden Death Syndrome (SDS) is causing the most concern right now but late-season *Phytophthora* root rot, bean pod mottle, *Septoria* brown spot, bacterial blight and downy mildew are also showing up in soybean fields across the state.

SDS is covered in detail in the following article in this issue of the Integrated Pest and Crop Management newsletter.

Late-season *Phytophthora* root rot can be difficult to detect unless actually walking in a field. Then it may be easier to pick out plants showing symptoms such as off-color, yellowing and wilting associated with late-season *Phytophthora*

Continued on page 93

Field Crop Disease Update *continued from page 92*

root rot. Infected plants may be scattered through a field, ringing a drowned out area in the field or clustered in low, wet areas of a field. Generally the entire plant shows an off-color, followed by yellowing, wilting and premature death of the plant. The stems show a characteristic brown discoloration that extends from below the soil line upward and even out the lower side branches of the plant.

Bean pod mottle causes a green to yellow mottling of young leaves in the upper canopy. Infected leaflets may also have a bumpy or rugose leaf texture. Generally vein distortion is not a symptom of this virus disease. Bean pod mottle symptoms are most apparent during periods of rapid growth and cool

conditions. The virus which causes this disease is spread by beetle species such as the bean leaf beetle.

The foliage diseases of soybean were covered in detail in Volume 18, Number 13 of the Integrated Pest and Crop Management newsletter (<http://ppp.missouri.edu/newsletters/ipcm/archives/v18n13/a2.pdf>) for information on *Septoria* brown spot, bacterial blight and downy mildew.

Laura Sweets
573-884-7307

Sudden Death Syndrome

By Laura Sweets

Symptoms of sudden death syndrome (SDS) started appearing the first of August and are now showing up in fields in almost all areas of the state. It has been several years since there has been a state wide outbreak of SDS so there have been numerous questions related to diagnosis of the disease and possible yield loss from SDS.

Symptoms of SDS may appear several weeks before flowering but are more pronounced after flowering. Foliage symptoms begin as scattered yellow blotches in the interveinal leaf tissue. These yellow blotches increase in size and merge to affect larger areas of leaf tissue. Veins typically stay green. The bright yellow blotches between the green veins give affected leaves a striking appearance. The yellow areas may turn brown. As the interveinal leaf tissue turns brown, it also dries out. Upper trifoliolates become brown and dry out. Severely affected leaflets may drop from the plant, leaving the petiole attached or they may curl upward and remain attached to the plant. Infected plants may wilt and die prematurely. Root systems may show deterioration and discoloration of lateral roots and taproot. When split open, internal tissues of the taproot and lower stem may show a light-gray to light-brown discoloration.

Currently symptoms in fields through the state range from slight yellow flecking between the veins of leaflets to leaflets in which the interveinal tissue has turned brown, dried out and curled up (Figure 1). Infected plants may be scattered through a field, concentrated in low areas of a field or along drainage patterns in a field or widespread throughout the field. Potential yield losses from SDS are difficult to estimate. Because the symptoms are so striking there is a tendency to overestimate the losses which will occur. Weather conditions during the remainder of the season will also influence losses due to SDS. Mild temperatures with adequate moisture or conditions which do not stress soybean plants should reduce losses from SDS. Periods of hot, dry weather that further stress plants might lead to more defoliation and even pod abortion on infected plants.



Figure 1: Soybean plant displaying sudden death syndrome symptoms.

Field observations suggest that SDS is more likely to occur and to be more severe with high soil moisture. High soil moisture during vegetative stages of growth seems to be the most conducive for disease development. This year much of the state had unusually high rain fall through July. So even later planted soybean fields were likely to have received rain when plants were in the vegetative stages of growth. The onset of SDS symptoms frequently is associated with wet conditions and below normal temperatures at or near bloom. The weather this season has been favorable for the development of SDS and for expression of SDS symptoms.

There are no rescue treatments for SDS. Management options for SDS include selecting varieties that have performed well where SDS has been a problem, improving drainage in poorly drained fields, avoiding compaction, staggering planting dates and delaying planting until soils are warm and dry, rotating crops and maintaining good crop vigor.

Laura Sweets
573-884-7307

Soybean Aphid Numbers Increase in Some Northern Missouri Counties

By Wayne Bailey

Soybean aphids continue to cause problems in several northwestern and northeastern counties with new problems developing in north central counties during the past two weeks. Soybean most at risk, are double crop or late planted beans in the early reproductive stages of growth. The economic threshold is calculated at 30% or more of plants supporting aphid populations of 250 or more aphids per plant in growth stages R1 (flowering) through R5 (early pod fill). This threshold has been tested in many states to the north of Missouri where soybean aphids often cause very severe problems. It is based on an economic injury level of 1006 aphids which is the actual number of aphids per plant where yield loss from this pest equals the cost of control. The 250 economic threshold number allows producers a few days to apply control measures before actual economic yield losses occur. Damage from soybean aphid is more severe on the early growth stages such as R1 (flowering) as compared to later growth stages through R5 (pod fill). Problems with this pest will decrease significantly as many soybean plants move past the R5 stage of growth.

Although low numbers of aphids initially migrated into the northern half of state about four weeks ago, these populations have expanded in Missouri with the presence of cooler than normal temperatures and the collapse of most beneficial insect populations. Cool temperatures occur naturally, but the collapse of the beneficial insect population may be the result of several factors such as the unnecessary application of insecticides during early season when producers are applying herbicides or later in the season when they apply fungicides. The collapse of beneficial insect populations have been observed in many states, but in Missouri this has a dramatic effect as beneficial insects such as insidious flower bugs and many species of lady bird beetles often keep low to moderate populations of pests such as soybean aphid from increasing to pest levels. The soybean aphid problems now being experienced are also the result of late planting of soybean which provide aphids with soybean plants in the early stages of growth much later in the growing season than in more normal years.

Producers are encouraged to scout for the aphids in order to determine pest status in their fields. Soybean aphids are



Figure 1: Adult soybean aphid (wingless).

best seen with a ten times or larger magnification lens (Figure 1). They are small teardrop shaped, lime green to yellow aphids which have black eyes, black legs, and two black tipped cornicles (tailpipes). This aphid species is the only aphid commonly found in colonies on soybean plants. They remove plant juices using their piercing-sucking mouthparts and may be found feeding on soybean foliage, stems and pods. If 30% or more of plants support aphid populations of 250 aphids or more in soybean at growth stages R1 to R5, then treatment of this pest is justified. Numerous insecticides are labeled for control of soybean aphids on soybean. Most offer protection for 14-28 days depending on weather conditions. It is important to read the pesticide label and follow all directions, precautions and restrictions listed.

Wayne Bailey
573-864-9905

Visit our Web site at ppp.missouri.edu

Temporary Manure Piles

By John A. Lory

High fertilizer prices have more farmers interested in using manure as a fertilizer. Animal operations schedule barn cleanouts around animal production needs, not when you need manure. When manure arrives at a time when it cannot immediately be applied to the field there may be a need to have a temporary manure pile until conditions are favorable for manure application. These temporary piles are frequently built on the edges of fields where the manure will ultimately be spread.

The most important advice to farmers using temporary manure piles is to make sure that no manure or runoff from the manure pile flows into streams, lakes or other waters of the state. Missouri Department of Natural Resources (MDNR) has developed a list of "best management practices" for temporary manure piles to help farmers protect water quality.

An temporary pile should be placed to insure runoff from the pile will not reach any water resources. Suggested distances are at least 300 feet from wells, public water supplies, losing streams and sinkholes and at least 100 feet from streams and lakes. Piles also should be placed at least 300 feet from neighboring residences and public areas and at least 50 feet from property boundaries.

Care should be taken to minimize the potential for stormwater runoff to pass through the pile or be retained by the pile. If runoff flows down hill through the pile a one-foot berm should be constructed above the pile to divert runoff around the pile. Such berms are required when the pile is on land with a slope of 2% or greater.

The pile should have a shape that facilitates shedding water. Avoid creating pockets or depression that could collect water within the pile. Multiple piles should be placed

to prevent damming of water between the two piles. There are no requirements to tarp a temporary manure pile.

Temporary manure piles are only appropriate for solid manure sources typically defined as having more than 25% solids content. Solid manure piles should not have seepage or require depressions in the soil grade to contain them.

Temporary manure piles may be maintained for no more than six months and a temporary manure pile cannot be in the same location two years in a row. The area of a temporary manure pile must be cropped in the subsequent crop year.

Typically there is some composting action in the manure pile. This will have the beneficial effect of killing weed seed and pathogens and concentrating phosphorus and potassium in the pile. Nitrogen is lost during composting but the nitrogen concentration in the pile will typically stay constant because loss of mass in the pile offsets the nitrogen lost.

Is it better to stack manure in the fall or apply it to fields? If you apply the manure into warm soils in the fall there is likely to be a lot of nitrate formation that has the potential to be lost over-winter. It would be less risky to temporarily stack the manure and apply it when soil temperature is cold (below 40 °F) or in the spring.

Permitted animal feeding operations have stricter requirements for temporary manure stacks. They can only stack manure in temporary piles for two weeks during the manure application season. Otherwise manure must be stored in approved permanent storages.

John Lory
LoryJ@missouri.edu

Should I apply fall N to pastures? *continued from page 91*

are feeding thin cows or growing cattle, poor quality hay will likely increase the cost to balance the ration or reduce animal performance.

Both purchased hay and stockpiled forage will suffer storage losses during winter. If you delay grazing until late winter, stockpiled forage may decrease in quantity by up to 50% (12 lbs increasing the nitrogen cost of feed to \$0.06/lb (\$120/ton) in our example). Losses in poorly stored hay can be similar.

The decision to purchase nitrogen fertilizer or purchase hay will depend on the type of operation you have and what type of risk you want to take:

- + If you need high quality forage and can maximize utilization through good pasture management while

managing year-to-year variation in the quantity of available forage then a stockpile forage system is ideal.

- + If you can purchase sufficient quality hay at a competitive price, have a way to store it without compromising quality and have a feeding system promoting nutrient distribution around your farm a purchased hay system has merit.

John Lory
LoryJ@missouri.edu
Rob Kallenbach
KallenbachR@missouri.edu
Justin Sexton
SextonJ@missouri.edu

Weather Data for the Week Ending August 25, 2008

By Pat Guinan

Station	County	Weekly Temperature (oF)						Monthly Precipitation (in.)		Growing Degree Days‡	
		Avg. Max.	Avg. Min.	Extreme High	Extreme Low	Mean	Departure from long term avg.	Aug 1-25-Aug	Departure from long term avg.	Accumulated Since Apr. 1	Departure from long term avg.
Corning	Atchison	84	63	92	57	73	-2	0.42	-2.85	2691	+77
St. Joseph	Buchanan	82	63	88	56	72	-3	0.98	-2.07	2576	-71
Brunswick	Chariton	84	62	89	55	72	-3	2.41	-0.93	2601	-77
Albany	Gentry	84	61	90	54	72	-3	0.38	-2.59	2531	-100
Auxvasse	Audrain	81	62	87	56	71	-3	1.85	-0.94	2564	-133
Columbia	Boone	81	64	86	57	72	-3	1.97	-1.24	2624	-177
Sanborn Field	Boone	81	65	87	58	73	-4	2.00	-1.20	2765	-110
Williamsburg	Callaway	83	62	92	56	71	-4	1.33	-1.90	2582	-71
Novelty	Knox	80	61	84	55	70	-5	1.84	-0.90	2388	-244
Linneus	Linn	81	61	86	55	71	-3	0.69	-2.37	2466	-100
Monroe City	Monroe	82	62	87	56	71	-4	1.26	-1.59	2494	-191
Versailles	Morgan	83	64	91	56	72	-4	1.71	-1.45	2768	-75
Green Ridge	Pettis	82	64	89	56	72	-1	0.48	-2.65	2689	+75
Lamar	Barton	84	65	90	57	74	-4	1.16	-1.40	2858	-105
Cook Station	Crawford	83	62	92	51	72	-5	2.97	+0.03	2621	-254
Alley Spring	Shannon	84	64	92	54	72	-3	1.79	-0.95	2641	-84
Round Spring	Shannon	83	64	89	54	72	-3	2.05	-0.74	2633	-97
Mountain Grove	Wright	81	64	91	56	71	-5	1.87	-0.53	2586	-127
Delta	Cape Girardeau	84	66	88	57	74	-4	2.14	-0.22	2917	-241
Cardwell	Dunklin	86	69	90	62	76	-3	3.46	+1.68	3287	-115
Clarkton	Dunklin	85	68	91	59	75	-4	2.71	+1.02	3172	-192
Glennonville	Dunklin	85	68	90	62	75	-4	2.42	+0.82	3202	-148
Charleston	Mississippi	85	68	90	59	76	-1	1.11	-1.03	3097	-40
Portageville-Delta Center	Pemiscot	86	70	88	63	77	-2	1.58	-0.19	3338	-16
Portageville-Lee Farm	Pemiscot	86	70	89	63	77	-2	1.01	-0.78	3335	+4
Steele	Pemiscot	85	70	88	62	76	-3	4.07	+2.13	3411	+58

* Complete data not available for report

‡Growing degree days are calculated by subtracting a 50 degree (Fahrenheit) base temperature from the average daily temperature. Thus, if the average temperature for the day is 75 degrees, then 25 growing degree days will have been accumulated.

Pat Guinan
 Commercial Agriculture Program
 573.882.5908
 GuinanP@missouri.edu