Integrated Pest & Crop Management

Virus Diseases May Begin to Show Up in Missouri Wheat Fields

By Laura Sweets

After a record low number of wheat acres in 2010, the wheat acreage in the state has been estimated at 750,000 acres, an increase of 103 percent over the 2010 seeded acreage. Unlike the last two years when wet fall conditions delayed or prevented wheat planting and lead to stand establishment problems, the fall of 2010 was actually dry in parts of the state. The unusually dry conditions resulted in some poor stands and slow plant development. Now that temperatures have finally begun to warm up, it may be possible to access stands for winter survival, uniformity and the presence of wheat virus diseases.

Green-up is the time of the year when symptoms of wheat spindle streak mosaic, wheat soilborne mosaic and barley yellow dwarf may become evident in winter wheat fields. Both wheat spindle streak mosaic and wheat soilborne mosaic tend to be more severe when wet conditions occur after planting in the fall or in the late winter/early spring months. Cool spring temperatures also enhance symptom development of both wheat spindle streak mosaic and wheat soilborne mosaic. Most of the state was dry last fall but this winter saw record or near record amounts of snow in much of the state. So it will be interesting to see how prevalent and severe wheat spindle streak and wheat soilborne are this season. Although there are no rescue treatments for wheat virus diseases, it is still a good idea to scout fields for plants showing virus symptoms and to send in samples to identify the virus or combination of viruses that are present so that proper preventative management measures can be used the next time wheat is planted in that field.

Descriptions of the wheat virus diseases most likely to occur on winter wheat in Missouri are given in the following paragraphs.

Symptoms of wheat spindle streak mosaic appear in early spring as yellow-green streaks or dashes on the dark green background of the leaves. These lesions usually run parallel to the leaf veins and tend to be tapered at the ends giving the lesions a spindle shaped appearance. Foliage symptoms are most obvious when air temperatures are about 50°F. As temperatures warm-up, foliage symptoms of wheat spindle streak mosaic tend to fade. Plants may be slightly stunted and have fewer tillers than normal. Wheat spindle streak mosaic tends to be more prevalent in lower, wetter areas of a field. The virus which causes this disease is soilborne and is spread by the soil fungus Polymyxa graminis. Wet falls tend to favor outbreaks of wheat spindle streak mosaic the following spring.

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Spring Soil Sampling for Soybean Cyst Nematodes

By Manjula Nathan

Soybeans planting is just weeks away, and it is important that you test your fields for Soybean Cyst Nematodes(SCN) now before planting. SCN is a major concern to growers throughout the state. These parasitic round worms invade the plant roots and suck nutrients from the plants, decreasing their ability to produce adequate yields. The challenge with preventing SCN is that infected plants do not easily express symptoms. Fields can sustain up to 30% yield loss due to SCN without displaying any symptoms, making sampling the only way to identify a problem that you might not actually be seeing. Producers often ignore the possibility of SCN because they plant resistant varieties, but it is important to realize that SCN can adapt to the resistance lines if the same source is used year after year. It is important to check SCN egg counts periodically (every three years) to see if the egg counts are increasing.

Although typically fall is a good time to check fields for SCN because the results will be available for use in making decisions and plans for the next growing season, especially in terms of crop rotation and soybean variety selection, it is still not too late to sample the fields now ahead of planting.

Since SCN egg counts are only as good as the sample taken, here are a few tips for sampling for SCN:

1. Limit the size of the area being sampled: 10 - 20 acres is a good target.
2. Using a bucket and probe or shovel, walk the area in a W or Z pattern, sampling about 8 inches deep between the rows. Take about 20 cores (with a shovel take ¼ cup of soil from near the shovel tip). Mix the cores well into a composite sample, and bag about a pint of it for submission.
3. Label the plastic bag, avoid storing it in the sun and ship it as soon as possible.
4. Fill out a submission form (available from our Website or your local extension agent) or on a piece of paper indicate:
    a. Name, address, phone, and email (if you have email, results can be sent quickly.)
    b. County and cropping history
    c. Type of test: SCN egg count ($15), HG Type race test ($50 in state, $100 out of state), or Complete Nematode Analysis ($20)
    d. The mailing address for the lab is:
    Extension Nematology Lab
    23 Mumford Hall
    University of Missouri
    Columbia, MO 65211

The SCN Egg Count test is what most soybean growers would need. If you notice a field that is slipping in yield, had high egg counts years ago to sample or you haven't had your soils tested for SCN in the last five years, a $15 SCN Egg Count test is a worthwhile investment that can offer peace of mind and save considerable yield loss. If results indicate that the egg count is medium or high, you may want to sample your other fields.

The HG Type race test would be for the grower who has high egg counts after growing resistant lines for years. This test indicates the HG type (or race) of SCN in the field, and what sources of resistance would be good to choose when buying seed. The website below offers a comprehensive listing of the "sources of resistance" for commercial soybean lines: http://www.ag.uiuc.edu/~wardt/cover.htm

The Complete Nematode Analysis test is a count of the worm stages of all the plant parasitic nematodes in the sample. (It does not give an SCN egg count.) This test would be important for growers in SE Missouri who may have the Root Knot nematode as well as SCN.

The Extension Nematology Lab has a website has more information on how to sample, the tests we provide, and how samples are actually run in the lab. A submission form can also be downloaded from the site. http://soilplantlab.missouri.edu/nematode . The turn around time for the lab is typically 3-5 to working days.

For management decisions regarding SCN please refer the University of Missouri Extension Guide on Soybean Cyst Nemtode: Diagnosis and Management. This guide can be downloaded at http://muextension.missouri.edu/xplor/agguides/crops/g04450.htm

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Wheat soilborne mosaic causes light green to yellow green to bright yellow mosaic patterns in leaf tissues. Symptoms are most evident on early spring growth, and warmer temperatures later in the season slow disease development. Symptoms of wheat soilborne mosaic are not always particularly distinctive and might occur as a more general yellowing similar to that caused by nitrogen deficiency. Infected plants may be stunted. This disease may be more severe in low lying, wet areas of a field. The soilborne wheat mosaic virus survives in the soil and is spread by the soil fungus Polymyxa graminis. Again, wet falls tend to favor outbreaks of wheat soilborne mosaic the following spring.

Barley yellow dwarf is an extremely widespread virus disease of cereals. Symptoms include leaf discoloration ranging from a light green or yellowing of leaf tissue to a red or purple discoloration of leaf tissue. Discoloration tends to be from the leaf tip down and the leaf margin in towards the center of the leaf. Plants may be stunted or may have a rigid, upright growth form. Symptoms are most pronounced when temperatures are in the range of 50-65°F. The barley yellow dwarf virus persists in small grains, corn and perennial and annual weed grasses. More than twenty species of aphids can transmit the barley yellow dwarf virus. Symptoms may be more severe and yield losses higher if plants are infected in the fall or early in the spring. Infections developing in late spring or summer may cause discoloration of upper leaves but little stunting of plants or yield loss.

The other virus disease likely to occur on winter wheat in Missouri is wheat streak mosaic, but symptoms of this disease are not usually evident until later in the season when air temperatures increase. Wheat streak mosaic causes a light green to yellow green mottling and streaking of leaves. Symptoms may vary with variety, virus strain, stage of wheat growth when plants are infected and environmental conditions. Plants may be stunted. As temperatures increase later in the spring, yellowing of leaf tissue and stunting of plants may become more obvious. The wheat streak mosaic virus is spread by the wheat curl mite. Symptoms are frequently found along the edges of fields where the mite vector first entered the field. Both the wheat streak mosaic virus and the wheat curl mite survive in susceptible crop and weed hosts. Thus, the destruction of volunteer wheat and weed control are important management options for wheat streak mosaic.

A management program for virus diseases of wheat should include the following steps.

- Plant good quality seed of resistant varieties.
- Avoid planting too early in the fall to minimize opportunity for insect vectors to transmit viruses to young plants.
- Destroy volunteer wheat and control weed grasses.
- Maintain good plant vigor with adequate fertility.

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Computer-Assisted Nutrient Management Courses Scheduled

By John Lory

A two-day course on how to write a nutrient management plan using computer software will be held three times in April and May.

The course will take participants step-by-step through the process of developing a nutrient management plan with particular focus on operations that use manure. The course will include hands-on computer instruction on using the AFOsite, Missouri Clipper, Spatial Nutrient Management Planner (SNMP), Purdue's Manure Management Planner (MMP), RUSLE2 in MMP, and the new Missouri document generators to develop your plan reports.

Three two-day courses are scheduled:

- April 14-15, 2011 at Southwest Research Center, Mt. Vernon, MO
- April 19-20, 2011 at Bradford Technology Transfer Center, Columbia, MO
- May 5-6, 2011 at Bradford Technology Transfer Center, Columbia, MO

Courses will meet from 9:30-3:30 each day. Cost includes the use of a computer during the training and two lunches. We plan on applying for CEU's for CCA's for this course. Pre-registration is required. Cost is $215 per person.

For more information or to register for the course call Christina at 573-884-6311 or visit the website http://www.nmplanner.missouri.edu/training/#computer.

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Soil Test Summary for Missouri Emphasizes the Need for Soil Testing

By Manjula Nathan

Soil testing is a tool that allows growers to plan their nutrient and soil amendment (lime) inputs based on soil test levels. The soil test summary provides a valuable index of the soil fertility status of Missouri farmland by county, soil region, and cropping system, and identifies broad soil fertility trends in the state over years. The soil test summary provides invaluable information regarding soil test status at the county, soil region and at the state wide levels. These data will be helpful to researchers and educators for developing educational programs and working on state and federal regulatory programs.

For soils to be productive, they must be fertile. Soil tests indicate the relative capacity of soil to provide nutrients to plants. Therefore, the soil test summary can be viewed as an indicator of the nutrient supplying capacity of soils in Missouri. The value of statewide soil test summaries lies in calling attention to broad nutrient needs. Two major uses of soil test summaries are (i) to evaluate fertilizer and lime recommendations, and (ii) to encourage the proper use of fertilizer and lime.

The soil test summary of 23,600 agronomic crop soil samples analyzed by the University of Missouri Soil Testing labs for 2010 is presented in this report. The percentage of samples falling under very low, low, medium, high, and very high levels for pH, P and K were calculated by county, soil region, and cropping option. But only the summary by county and cropping option is presented. Soil test data summary and statewide trends are presented in graphical format.

Soil Test Procedures and Rating:

- pHs: 1:1 (0.01 M CaCl2)
  Very low: <4.4 Low: 4.5-5.3; Medium: 5.4-6.0; High: >6.1

- P: Bray 1 P lb/acre
  Very low: <14 Low: 15-22; Medium: 23-45; high 46-70; Very High:>71

- K: Ammonium Acetate Extractable K mg/kg
  Low: <65; Low: 66-110; Medium:111 -220; High: 221-330; Very High:>331

Figure 1. Soil pH Levels in Missouri by County - 2010

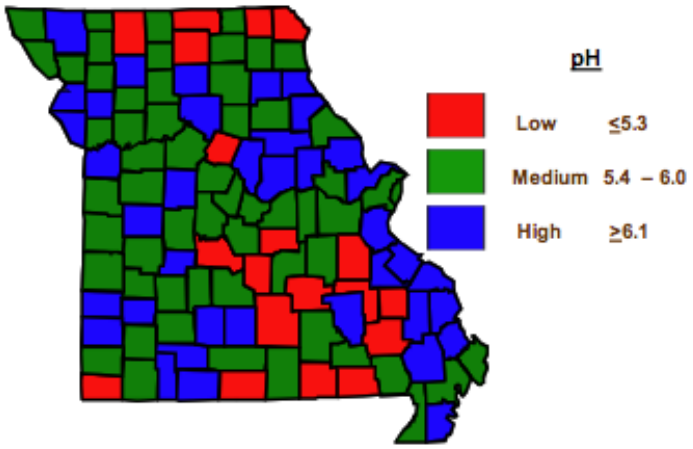


Figure 2. Soil Test P Levels in Missouri by County - 2010

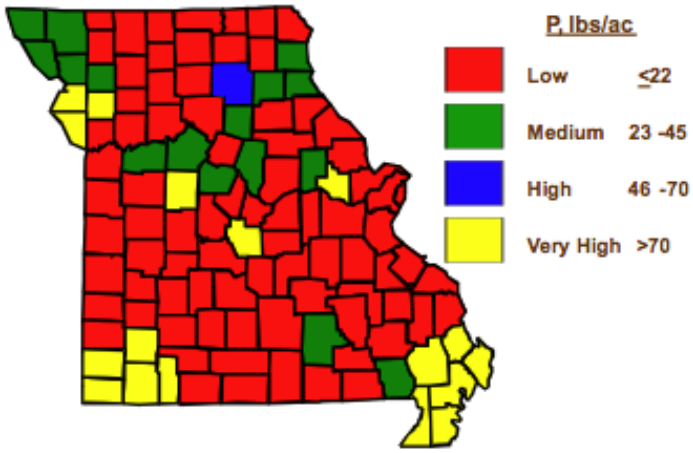
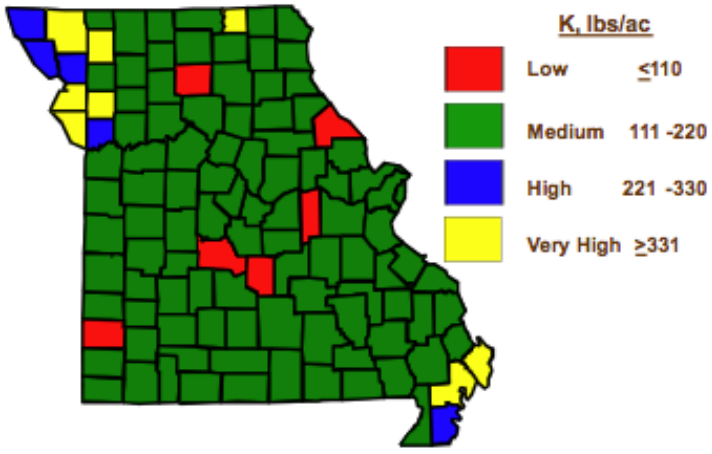


Figure 3. Soil Test K Levels in Missouri by County - 2010



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The majority of the samples received from Missouri counties had pH greater than 5.4 (Fig. 1). About 26% of the soils tested indicated that lime should be applied for economically viable crop production (pH <5.3; Fig. 1, Fig 6). Another 39% of the soils are likely to need lime (pH=5.4-6.0) to avoid profit loss.

The majority of counties in Missouri have low P (< 22 lbs/ac) soils (Fig. 2). This is also evident from the statewide trend data presented in Fig. 6. About 48% of the P tests (< 22 lb P/ac) indicated that P fertilizer is essential to avoid profit loss by major crops. Another 23% of the P tests (23 - 45 lb P/ac) indicate P fertilizer is required for economic crop production.

The majority of counties in Missouri have medium K (112-220 lb K/ac) soils (Fig. 3).About 60% of the K tests (Low :< 110 lb K/ac + Medium: 111-220 lb K/ac) indicated that K fertilizer would be required to avoid profit loss by major crops (Fig. 6).

Soil tests summarized by Missouri soil regions showed that the majority of samples from soil regions Ozarks and Ozarks border had a higher percentage of soils falling under the low (<5.1) to medium (5.2-6.0) pH ranges (data not presented). The majority of samples received from the same soil regions had a higher percentage of low P (<22 lb/ac) soils. The soils in the Ozarks and Ozarks boarder region are highly weathered, highly acidic and are inherently low in soil P. The soil test summary of P by soil region reflects a similar pattern. On the other hand, Bootheel region had a higher percentage of soils testing high in pH (>6.1) and P (>45 lb/ac). As observed in soil test distribution by county (Fig 3), the majority of the samples from all soil regions had medium soil K levels (112 – 220 lb K/ac)..

The soil test summary by cropping options (Fig 4 and 5) shows that a higher percentage of the soils tested for corn, soybean, wheat, and alfalfa had high pH (>6.1). Alternatively, the soils tested for forages mainly cool and warm season grass pasture/hay had a higher percentage of soils testing in low (<5.1) to medium (5.2-6.0) levels of pH (Fig 4). A similar trend is observed with soil test P for cropping options (Fig 4). About 40 – 45% of the soils tested for cool season and warm season grasses tested very low in P (< 14 lb P/ac) indicating a dire need for testing

Figure 4. Soil Test Summary for pHs, P and K Distribution for Forages

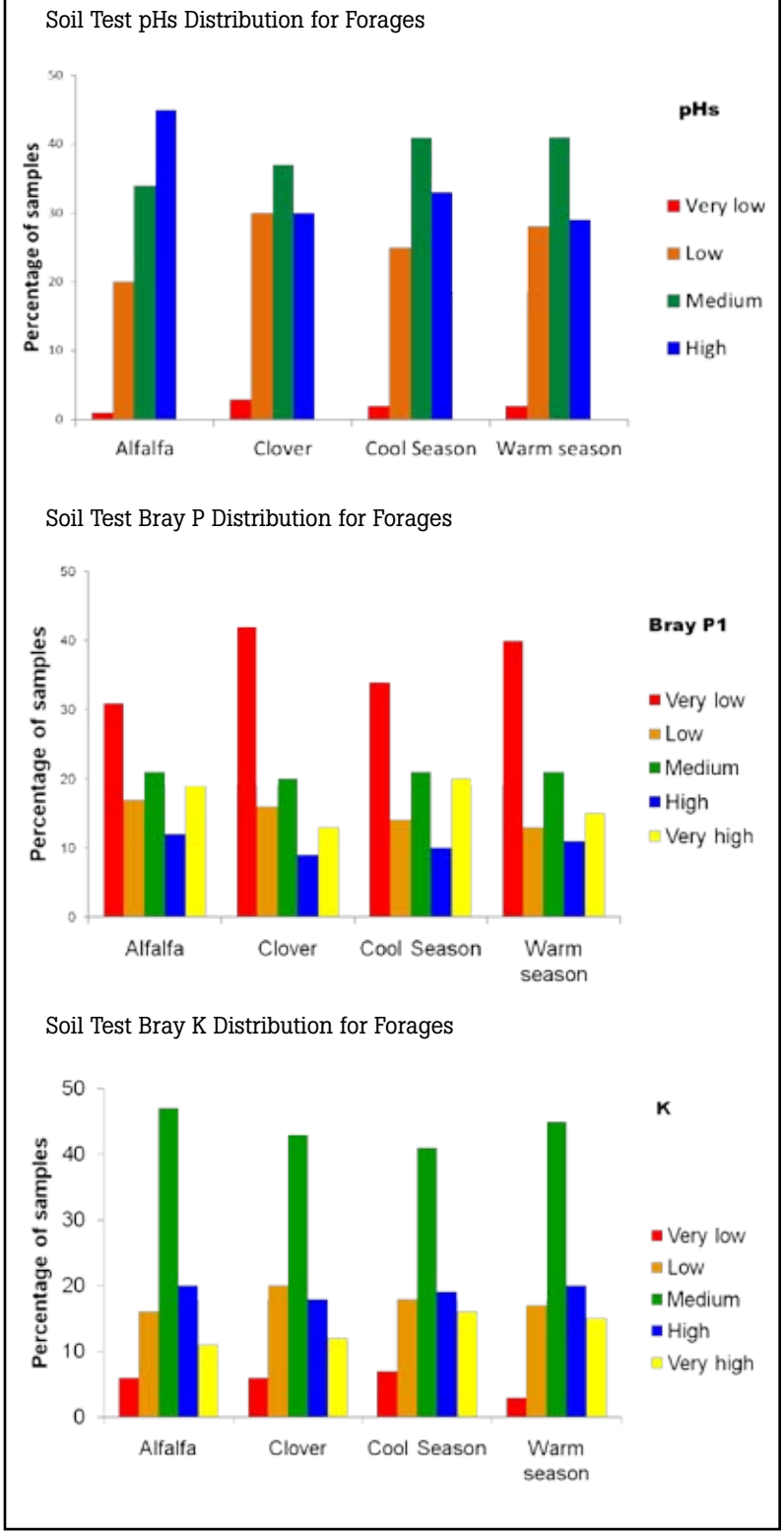

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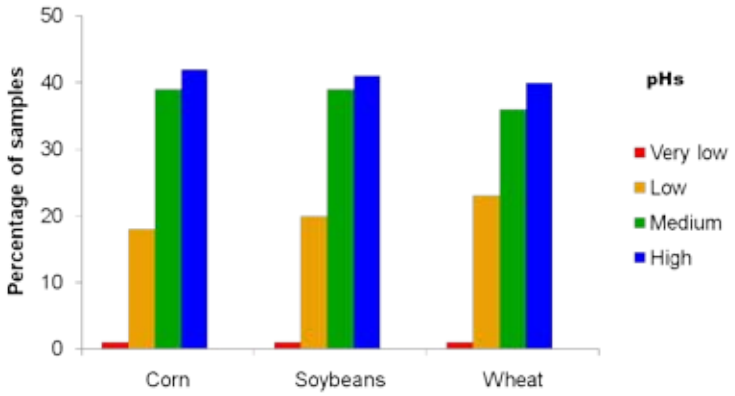
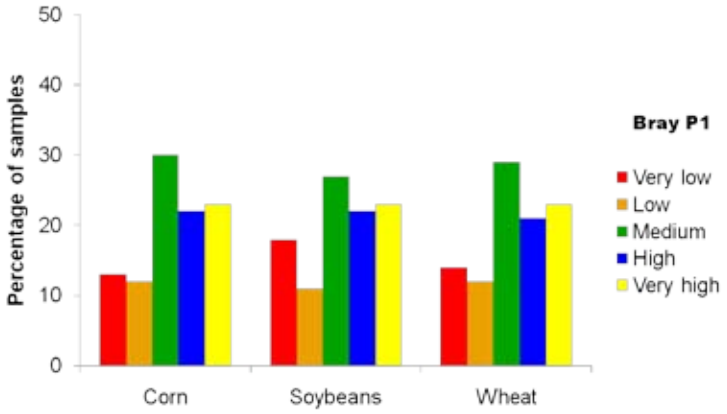
Figure 5. Soil Test Summary for pHs, P and K Distribution for Corn Soybeans and Wheat

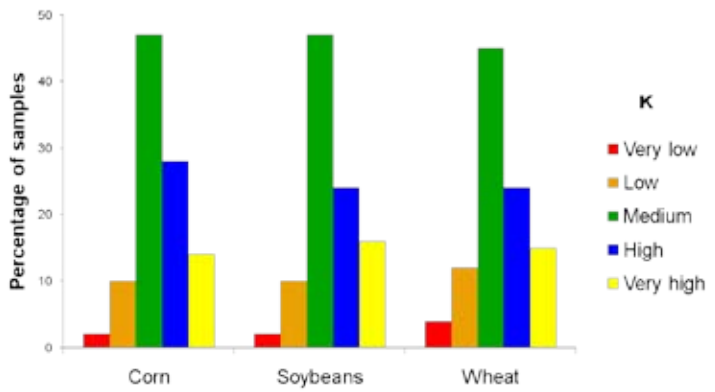
Soil Test pHs Distribution for Corn, Soybeans and Wheat



Soil Test Bray P Distribution for Corn, Soybeans and Wheat



Soil Test K Distribution for Corn, Soybeans and Wheat



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soils and applying P fertilizer per soil test recommendations. Irrespective of the crop options, the majority of samples received by soil testing labs had medium soil test K levels (112-220 lb K/ac, Fig 4 and 5).

Summary:

The soil test summary provides invaluable information regarding soil fertility status at the county, soil region and state levels. A higher percentage of adequately fertilized soils occur in the intensively cropped Bootheel region. Conversely, the highest percentage of low fertility soils occurs in the highly weathered Ozarks region. Soil test data summary by cropping options clearly indicates that corn, soybean, and wheat fields are better managed than the forage crops.

The statewide trend observed in the past decade of the steady increase in the number of soil samples being tested as low for pHs, P and K emphasizes the need for producers to tests these soils frequently and apply fertilizer and lime as per recommendation to avoid potential yield losses and depletion of essential nutrients for plant growth and economically viable crop production.

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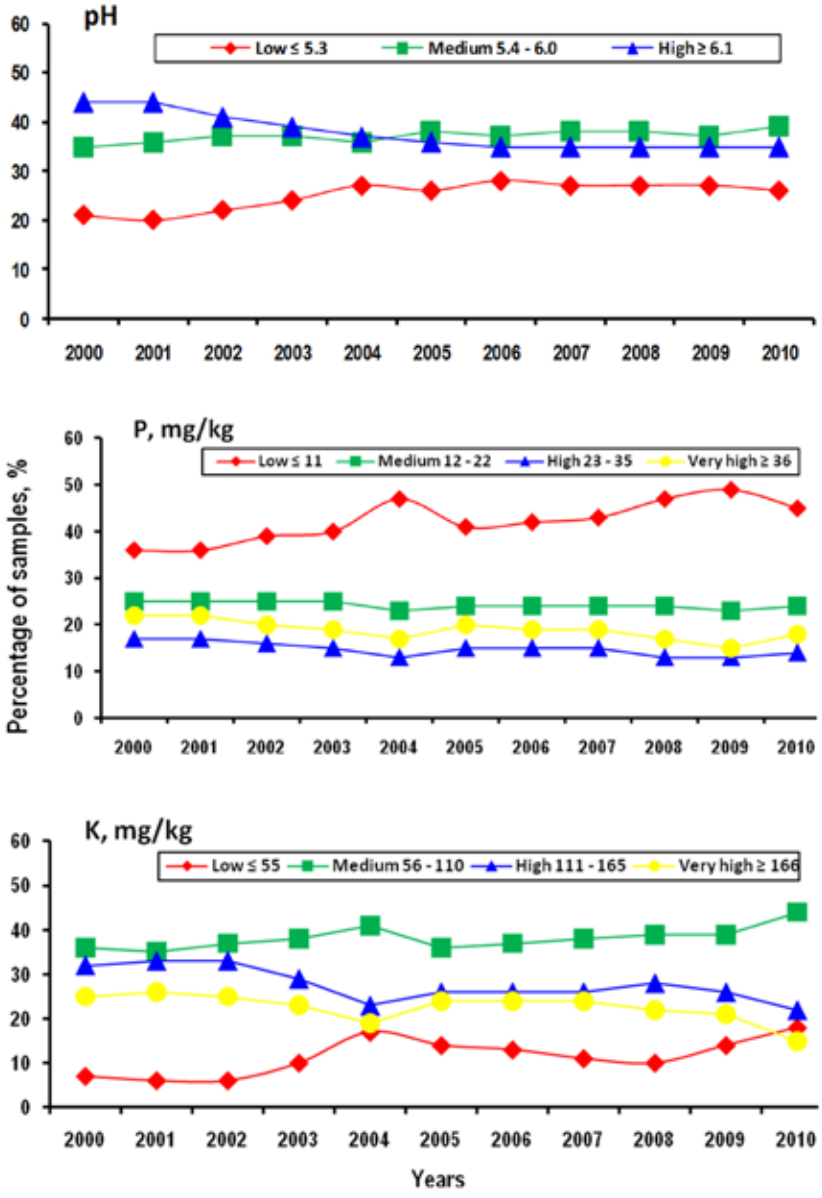
Figure 6. Trends in Soil pH, P and K in Missouri Soils (2000-2010)



NOTE: *The above figure has P and K in units of mg/kg and the rest of the data for P and K are provided on lb/ac units. Please note the trends remains the same independent of units. The conversion of mg/kg to lb/ac is by multiplying by 2.*

Topdressing Winter Wheat

By Peter Scharf

Wheat producers in Missouri are contending with a wet early spring, which has complicated the situation for topdress N applications. Some producers haven't completed their topdressing and are worried about getting it done. Others applied their N and are worried about the possibility that it has been lost or moved deep into the root zone.

I don't think that either group is in serious trouble at this point.

My opinion is that we are still in the ideal window to apply N in central and north Missouri. I recommend applying topdress N just before the first joint appears on the wheat. In central Missouri, that's still weeks away. The main uptake period is from the time that the second joint appears until flowering. Earlier applications appear to be at risk of loss. In two years of experiments near Columbia, mid-March N application gave 10 bushels more wheat than mid-February applications, and 20 bushels more than mid-January applications.

Once field conditions are right, it won't take long to topdress all remaining fields. If we're unlucky, fields will stay wet and topdressing will be difficult for an extended period.

Once the first joint has appeared, it's time to really step up efforts to get to fields that haven't been topdressed yet. Not to panic, but maybe to move to plan B–airplane, floater, even 4-wheeler. As I read the limited research with applying N after the first joint appears, my interpretation is that it's critical to get the N applied by the time the second joint appears. Further delays are likely to result in yield loss.

Most producers in southern Missouri have probably completed their topdressing. If they have a concern, it's about the possibility of losing their N. **This may be a real problem for producers in the bootheel who applied N early on sandy soils**, but for all other situations I would say that the risk of a problem is low.

Most of the bootheel has received 7 or more inches of rain from mid-February to mid-March. The rule of thumb is that 'movable' forms of N will move downward six inches for every inch of water that moves through a sandy soil. Does this mean that N applied in mid-February is now 7 x 6 = 42 inches deep? Maybe. But mostly not. And if so, it still may not be a problem.

Urea and nitrate are 'movable' forms of N. Ammonium is not. If urea is applied, it converts to ammonium, probably in about two weeks at this time of year. The ammonium then converts to nitrate, which takes another two weeks. So N applied as nitrate (one-fourth of the N in UAN solution, half of the N in ammonium nitrate) may be 42 inches down in sandy soils. Nitrogen applied as urea or ammonium will not be as deep. The urea can move downward as easily as nitrate, but will slow down once it converts to ammonium. Ammonium won't move much, but will start to move again once it converts to nitrate.

In many cases, less rain has moved through the soil than has fallen. At the time of application, the soil was probably not full. Part of the rain goes to 'fill' the soil. Also, intense rainfall may lead to runoff, even in soils that tend toward being sandy.

My experience is that, on sandy soils, wheat will usually put roots down 4 feet or more. Even for N that has moved down 42 inches, the wheat will probably be able to get most of it if it doesn't go too much farther.

In summary, if your wheat isn't topdressed yet, don't worry that you already have a yield drag, but focus on getting N applied by first joint if possible and second joint at the latest.

And if you applied N early on a sandy soil in the bootheel, assess your situation based on the information in this article, the timing of your application, and how much rain you have received since that date. If you get substantially more rain and your wheat has an N-deficient appearance, consider an additional application of 30 to 50 lb N/acre.

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Recent Concern About the Impact of Glyphosate Use

By Laura Sweets and Kevin Bradley

Recent on-line articles and blogs have renewed the debate concerning the safety of both genetically modified crops and the use of glyphosate in the environment. These articles have focused on the serious consequences of increased glyphosate use and the release of additional genetically modified crops such as Roundup Ready alfalfa. Evidence to support these most recent claims has not been published in scientific journals nor presented at scientific meetings. Until data to substantiate these claims is published it is difficult to evaluate the validity of the majority of these statements. Several Purdue scientists have just released a thoughtful and thorough document which clarifies some of the issues related to the claims being made. This article may be found at the following link (http://www.btny.purdue.edu/weedscience/2011/GlyphosatesImpact11.html).

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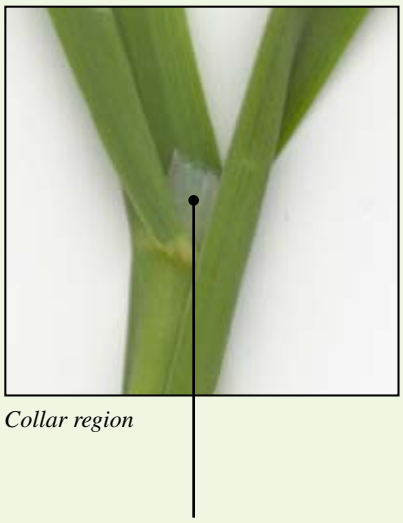
Forage of the Month: Orchardgrass

By Rob Kallenbach

Orchardgrass *(Dactylis glomerata L.)*

Orchardgrass is a popular grass for pasture, green chop, silage and hay throughout the central part of the eastern United States. The high rainfall, moderate winters and warm summers of southern Missouri make that region an optimal orchardgrass habitat. Under such conditions, orchardgrass both grows and tillers rapidly, which makes it especially useful in early spring pastures. Forage yields of 7,000 to 10,000 lb/acre are not uncommon under good management. Orchardgrass is more drought tolerant than timothy or Kentucky bluegrass but is not as drought-tolerant as smooth bromegrass or endophyte infected tall fescue. Orchardgrass does not persist as well as other cool-season grass species because it is susceptible to overgrazing, winter kill and leaf rust. Orchardgrass matures earlier than most other cool-season grasses, which makes early grazing or harvesting a must if highquality feed is to be obtained. Choosing a variety that matures late can help increase forage quality. It is considered more wildlife friendly than tall fescue.



Collar region

Membranous ligule

Seed head

Orchardgrass

Origin: Europe and North Africa
Adaptation to MIssouri: Statewide
Growth habit: Perennial bunchgrass
Blade: Folded in bud, cross section V-shaped at base, sharply keeled, taper to an acute point, margins smooth to scabrous.
Sheath: Smooth, open distinctively flattened and keeled.
Ligule: Truncate, membranous, 1/10 to 1/3 inch long.
Auricles: Absent.
Seed head: Stiff, mostly compact panicle with lower branches longer than those at top.
Fertilization: 40-60 lb N/acre after first grazing or harvest in spring; follow with another 40 lb N/acre after second grazing if conditions permit. Also, apply 40 to 60 lb N/acre mid-August for fall pasture. Phosphorus and potassium to soil test.

Timing for production: 60 percent of growth before June 15.
When to begin grazing: When the grass reaches 6 to 8 inches in height.
When to cut for hay: Early heading stage, typically in late April or early May.
Lowest cutting or grazing height: 4 inches
Fall management: Grazing possible in September and October; leave a 6-inch stubble for winter.

Nitrogen on Corn: Serious Deficiencies in 2010, plans for 2011

By Peter Scharf

2010 was another year of serious nitrogen deficiencies across the Missouri corn crop and through much of the midwest. That makes three straight years of widespread nitrogen deficiency in many parts of Missouri. The deficiencies were caused by high rainfall in spring and early summer, leading to loss of nitrogen fertilizer applied before the crop was planted.

The excessive rainfall affected the northern two-thirds of the state, with counties in the northeast corner most severely affected. Western Illinois and southeastern Iowa were also in the highest rainfall zone. Judging from aerial photographs, parts of western Illinois experienced the most widespread and severe N deficiencies.

Despite the nitrogen deficiencies, Missouri corn yields were better than average but 25 bushels below the yields realized in 2008 and 2009 when heavy rains also caused nitrogen deficiency. Similarly, Illinois corn yields were 20 bushels below the 2008-09 average. The reason for the yield drop in 2010 is not clear, but it seems likely that the string of three wet years affected the soil in a way that hurt corn production. Yield in plots receiving no N fertilizer declined from 104 bushels in 2007 to 8 bushels in 2010 in an experiment near Columbia. This suggests that the three wet years depleted soil nitrogen reserves dramatically. We expected soil nitrogen to be depleted when no N fertilizer was applied, but we didn't expect it to go this far in a few years. Some factor other than N limited corn yields in 2010, because even with high N rates applied sidedress yields were still well below 2008-09 levels. I don't know what that factor was, and like many producers, I expected higher yields than we got.

In all three years, water availability to the corn crop was excellent. Over decades, insufficient water is our most limiting factor for corn production in Missouri, so by rights we should have had top yields all three years. Yields in 2008 and 2009 WERE very good, but based on aerial photos and roadside surveys in August of both years I estimated that nitrogen deficiency reduced Missouri's corn crop by 180 million bushels over this two-year period. I did not do a careful accounting for 2010, but the weather was if anything more extreme and many aerial photos revealed N-deficient fields. I feel confident in saying that **untreated N deficiency would have caused at least 90 million bushels of yield loss again in 2010**.

The good news is that more fields with N deficiency were treated in 2010 than ever before. I have talked with people who have first-hand knowledge of rescue N application on about 40,000 acres in Missouri in 2010, and I've heard indirectly of about 15,000 more acres. MFA organized aerial N applications for their customers at the Macon, Labelle, and Memphis locations, and Ricketts Farm Services applied N with a high-clearance spinner. David Edwards, an ag pilot from Richmond, applied N on about 15,000 acres. Several producers with high-clearance injectors or sprayers did extensive custom work as well as their own fields.I applaud all those organizations and individuals who took effective steps to deal with N deficiency in 2010. **Still, there were probably twenty times as many fields that should have been treated.**

Nitrogen-deficient corn northeast of Monroe City in late June 2010. Streaks are due to uneven N fertilizer application. Streak width is 40 feet (16 rows) which may indicate an anhydrous ammonia toolbar or a small spinner spreader.

Are rescue N applications really effective? And how late can they be effective? I worked with several producers to conduct a total of six rescue N experiments in Missouri and Illinois in 2010. **The average yield response to rescue N in these experiments was 34 bushels/acre**. In all of these fields, the N was not applied until the corn was tasseling. Earlier application would have been desirable, and may have produced a bigger response, but when N stress is

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Nitrogen on Corn: Serious Deficiencies in 2010, Plans for 2011

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present it's clear that tasseling is not too late to apply rescue N. Limited data from Nebraska suggests that large responses can occur until two weeks after tasseling.

Multiplying an estimated 55,000 acres of rescue N applied by a measured response of 34 bushels/acre in the six tests we did gives a state total yield benefit of about 1.9 million bushels. Probably there are more acres that received rescue N than I have estimated.

Over my career I've been involved in 11 rescue N experiments, and the pattern that emerges is that the size of the response depends on the degree of N stress. In the experiments with high N stress, average yield response has been 57 bushels, in those with medium stress it has been 41 bushels, and in those with low stress it has been 14 bushels. Profit to rescue N applications at the low-stress sites has been modest, but **with medium or high stress the profit to rescue N applications is huge**.

Nitrogen deficient corn fields north of Canton, MIssouri in late June 2010.

I've heard many producers (and researchers) say that the severely N-deficient corn will never catch up and yield well, so there's no point in putting N on it. This statement is half true. In fields where we did more than one response experiment, the less stressed area usually yielded more even with generous rescue N applications to the more stressed corn. However, **the more stressed corn always gave a bigger yield response to rescue N**.

What is the take-home message as you plan for your 2011 corn crop? **Be ready to apply N in-season**. **And plan how you would do it NOW**. It is almost impossible to make all the logistics come together when you start working on it after you see N deficiency in June.

If you get wet weather and are wondering whether your N is in danger, I suggest that you check my Nitrogen Watch web feature. It launches in late April each year and is located on my Nitrogen Loss web page: http://plantsci.missouri.edu/nutrientmanagement/nitrogen/loss.htm

This site uses rainfall maps to track areas at risk for N loss and deficiency. The 'danger areas' shown are not areas that already have a problem, but are areas that are on track to have a problem.

Several producers have switched to planned in-season N applications in response to multiple years with N deficiency. Their approaches have emphasized speed, because the years that cause N loss are also the years when it's hardest to get sidedressing or topdressing done. High-clearance spinners can cover a lot of ground (but be careful to make sure they have good-quality material in them to avoid streaking). The number of retailers and producers with this type of machine is increasing. Pull-behind spinners offer many of the same advantages at lower price. Liquid N systems that dribble or inject N are often faster and wider than the anhydrous ammonia toolbars that come to mind when someone says 'sidedress'. Even with anhydrous, new equipment from John Deere is shallower, faster, and wider to speed up the operation. Applying in-season N is more practical now than ever before.

No one knows what the future holds for us in terms of weather. But the people who study climate and create computer models of climate suggest that wet springs and summers in the midwest are likely to become more common than they have been in the past. If they are right, we need to take action to avoid the yield losses (I estimate 500 million bushels/year across the whole midwest) that have plagued us the past three years.

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Weather Data for the Week Ending March 19, 2011

By Pat Guinan

Station	County	Weekly Temperature (°F)						Monthly Precipitation (in.)		Growing Degree Days‡	
		Avg. Max.	Avg. Min.	Extreme High	Extreme Low	Mean	Departure from long term avg.	Mar. 1-Mar. 19	Departure from long term avg.	Accumulated Since Apr. 1	Departure from long term avg.
Corning	Atchison	60	33	77	23	47	+5	0.27	-1.06	*	*
St. Joseph	Buchanan	57	35	75	26	46	+3	1.00	-0.32	*	*
Brunswick	Carroll	56	37	75	31	47	+4	1.48	+0.02	*	*
Albany	Gentry	59	30	77	21	45	+3	0.52	-0.85	*	*
Auxvasse	Audrain	55	37	74	30	46	+2	2.38	+0.73	*	*
Vandalia	Audrain	55	36	73	29	45	+2	2.30	+0.49	*	*
Columbia-Bradford Research and Extension Center	Boone	54	36	72	31	45	0	2.68	+0.95	*	*
Columbia-Jefferson Farm and Gardens	Boone	54	38	73	31	46	+1	2.53	+0.81	*	*
Columbia-Sanborn Field	Boone	55	39	73	32	47	+1	3.02	+1.29	*	*
Columbia-South Farms	Boone	54	38	74	31	46	+1	3.27	+1.54	*	*
Williamsburg	Callaway	55	37	77	31	46	+2	2.53	+0.83	*	*
Novelty	Knox	56	35	72	27	45	+3	0.94	-0.63	*	*
Linneus	Linn	56	35	74	28	46	+4	1.21	-0.26	*	*
Monroe City	Monroe	55	36	72	28	45	+2	0.89	-0.71	*	*
Versailles	Morgan	57	39	74	31	48	+1	2.63	+0.87	*	*
Green Ridge	Pettis	56	38	74	30	47	+2	1.77	+0.12	*	*
Lamar	Barton	58	42	74	32	49	+2	2.86	+0.73	*	*
Cook Station	Crawford	60	36	79	26	48	+1	3.79	+1.59	*	*
Round Spring	Shannon	63	37	78	26	48	+1	2.99	+0.58	*	*
Mountain Grove	Wright	60	39	74	31	48	+2	2.79	+0.34	*	*
Delta	Cape Girardeau	59	41	71	31	50	+1	3.48	+0.86	*	*
Cardwell	Dunklin	61	44	74	34	52	+1	3.90	+1.31	*	*
Clarkton	Dunklin	60	42	76	33	51	+2	3.26	+0.90	*	*
Glennonville	Dunklin	60	44	76	34	52	+2	3.28	+0.96	*	*
Charleston	Mississippi	59	42	72	35	51	+2	4.42	+2.12	*	*
Portageville-Delta Center	Pemiscot	61	45	75	37	53	+3	3.47	+0.93	*	*
Portageville-Lee Farm	Pemiscot	60	45	74	38	53	+3	3.57	+1.09	*	*
Steele	Pemiscot	61	45	74	36	53	+3	3.48	+0.79	*	*

* 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.

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