September 15, 2009

AgVantage Green Notes

Volume 15, Issue 9

Drive-by Scouting Soybeans

By Anne Dorrance, Ohio State—We have had some great weather for field scouting and now is the perfect time for a drive. The crop is just starting to turn in many areas of the state. *A field that is maturing normally – will all turn yellow at about the same time, maybe a bit delayed around the edges but by far every plant will start to mature at the same time.* ***Fields with issues, like SCN will not.*** One of the key findings last year in the soybean check-off funded project was this difference in maturity in areas of the study site that had high populations of SCN at the end of the season. These are perfect spots to check for SCN. Sometimes you can see the white pearls (females) on the roots indicative of SCN and sometimes you can't. If the females have all formed that brown-colored hard shell, which serves as their protective layer for long time soil survival then SCN may be difficult to pick out.

Another caution on these "drive by's" is that many late season diseases look the same: white mold, sudden death syndrome (SDS), brown stem rot (BSR), Phytophthora and last but not least – stem canker. In addition, often rare in these parts, charcoal rot, can also be present too and adds further insult to injury in areas which are dry. Each of these utilizes a different management strategy – so it is worth doing the ***"soybean crawl" (slowing down to at least 15-20 mph or better yet getting out of the car to investigate*** to get to those spots to check it out. Some short diagnostic features:

White mold – at this point, stems are bleached white and soft like straw with sclerotia (black irregular shaped bodies) both inside and outside the stem.

Inside this issue:

Planting Wheat this Year - A Few Reminders

Plant after the fly free date. The fly free date is from Sept 22-23 around Roselawn to Oct 5-6 in Vincennes.

Prepare a clean even seed bed. Wheat after soybeans can easily be no-tilled or conventional tilled. If planting wheat after wheat, corn or grassy weeds **till** to limit potential diseased crop residue at the soil surface. Previously diseased wheat or corn residues can increase potential for head scab at wheat flowering.

Properly check the drill and adjust if necessary. Check the drill's drive wheel tire pressure, disc bearings, and seed tubes and run seed through all the units to see if they are functioning normally. Calibrate and adjust the drill if necessary.

If you plan to save seed, *get your seed cleaned and treated*. Seed can be treated at any location. Seed can be treated with Incentive RTA, and Cruiser or NitroShield or both. call your local branch for more details.

Select a well adapted high yielding varieties with good powdery mildew, Stagonospora leaf blotch resistance and if you can, tolerance to Fusarium head scab.

Plant 1-1.5"" deep. Planting a consistent 1-1.5" depth allows good fall root development, reduces potential winter kill, and reduces potential yield loss in too deep or shallow wheat.

Increase seeding rates. Ideal seeding rates range between 1.4-1.6 million seeds/A.

Optimize soil fertility. Soil pH should range between 6.0-6.4, soil P between 50-70 lb/A, soil K between 250-300 lb/A.

Apply 15-20 lb/A actual N at planting. Applying nitrogen (N) at planting with P and K ensures good fall root development and plant health. N can be applied at planting or after wheat emergence.

Apply 10-15 lb/A of actual sulfur to wheat grown in sandy soils. Sulfur can be applied in the spring with nitrogen or part of it can be applied in the fall with the plowdown fertilizer.

Scout fields for pests. What pests? **Weeds and aphids** are our most yield damaging pests. Remember that aphids can vector the barley yellow dwarf virus. The weeds cheat, downy brome and chickweed are tremendous competitors to yield. **Cheat and downy brome** can easily choke out emerging wheat resulting in lower tiller numbers. And cheat and downy brome are more easily controlled in the fall. **But what about wild garlic?** Wild garlic is best controlled in the spring.

Apply at least 90-120 lb/A actual N during spring. Think about 1.25 -1.5 lb/A total actual N per bushel wheat. Consider split application to ensure ample available N for grain fill.

If **no-tilling wheat** (assumed into soybean stubble) use combine straw choppers and set chaff spreaders when combining beans to evenly distribute residue. Select varieties that have good winter hardiness. Once you begin drilling check the field several times to ensure uniform planting depth and good seed to soil contact. **Apply a burndown before or immediately following the drill.** Again Winter annuals such as cheat, downy brome and chickweed strongly compete with wheat.

Thinking about Fertilizer Again this Fall—Fabian G. Fernandez, U of IL

Although crop nutrient prices are lower this year with low commodity prices there is still a needle for conscientious planning and sound strategies to continue to produce high yields while maintaining profitability. At times of high input costs, there may not be enough resources to cover all the aspects of crop production , so prioritizing resources will be key. Soil fertility decisions such as fertilizer and lime applications must be weighed against other crop production needs and farmers' goals.

When considering the nutritional needs of a crop, the goal should be to obtain the greatest return on investment by focusing on inputs that will result in the greatest profit. Consider a barrel with staves of unequal lengths, in which the shortest stave determines how much the barrel can hold. In terms of soil fertility, the staves could represent soil pH, nitrogen (N), phosphorus (P), potassium (K), or other nutrients needed by the crop. Thus, the first step in assigning priorities should be to determine what is limiting the crop. ***In light of current commodity and crop prices and the relatively inexpensive cost of soil analysis, soil testing for pH, P, and K is probably the single most important step toward increasing profit margins***.

Once the fertility factors that likely would limit the crop yield have been determined, the obvious next step is to correct the potential limitation. For instance, if K levels are low and all other nutrients are adequate adding more P will not help increase yield since the crop is being limited by K. This sounds simple, but often this concept is overlooked when people go ahead and apply "a typical rate" without first determining what is actually needed. ***Supplying the nutrient in shortest supply not only helps to maximize yield, but it also makes it possible to optimize the fertility already present in the soil. Often more than one nutrient is limiting the crop. In those situations applying at least a portion of every limiting nutrient will be a better strategy than focusing on only one of them.***

Soil pH has an important impact on the availability of nutrients, so checking and adjusting soil pH should be one of the first steps to consider. It is recommended that pH be maintained at least at 6.0 for corn and soybean. If resources allow it, it is always better to bring pH to 6.5. In a practical sense, adjusting soil pH means that if the same amount of fertilizer were to be applied at a pH below 6.0, the availability of that application would be lower than if the amount were to be applied at a pH slightly above 6.0.

Additional strategies that can help increase the efficiency of the fertilizer application include these:

- ***Applying nutrients to the portions of the field with highest likelihood of response, instead of doing an average application across an entire area*** (Editors note: - Intensive soil sampling using the Ceres Solutions AgVantage Program allows you to do this.)
- Maximizing the efficiency of the nutrient by minimizing losses and by increasing its availability
- Accounting for all nutrient sources already present in the cropping system before making an application like N credits for soybeans and N and P credits in starter fertilizers.
- Determining which crop will perform better under the given conditions. For instance, if limited resources do not allow for a full rate of lime application to bring pH to the desired level, corn may be a better planting option than soybean because corn is less sensitive to lower pHs. If you plant wheat this fall, it is critical to have adequate P available. If a full P rate cannot be afforded, supply as much as possible at planting.
- Not being afraid to cut or eliminate an application if soil test levels are well above the point where a response is expected. Doing this will allow resources to be used where they are truly needed.

What about annual applications versus two years of fertilizer applied in one year? University of IL research indicates as long as you apply

Improve Your Spring Outlook with Fall Weed Management

Winter annual weeds can already be found. Now is the time to plan which fields are good candidates for fall herbicide applications.

So why consider a fall weed management program?

Warmer and improved seed bed in the spring—Universities and crop protection companies have documented as much as 12-13 increased degrees in weed free environments compared to weedy environments in mid May. Weed free environments measured in the high 60's F whereas weedy environments measured in the mid 50's F. Those tremendous differences in soil temperatures could translate into quicker emergence and the potential for increased yield.

Optimizing yield through more timely planting and improve seed to soil contact. Both of these go hand in hand. More timely planting in conjunction with good seed to soil contact could have a huge impact on improved yield when the whole field emerges earlier and at the same time.

Reduced spring workload—Think of all those springs where we have one to two days of good planting followed by rain followed by a few single days of planting and more rain (**Spring 2008 ring a bell?).** Just imagine how timely you could plant if some of your workload was handled with the previous falls residual herbicide application. ***Even if you plan to till before planting, the tillage passes could be reduced down to one shallow pass immediately followed by planting.***

Reduce soybean cyst nematode weed hosts—Purdue recently documented in the field and lab several winter annual weeds such as henbit, purple deadnettle and shepherds purse that can serve as strong to moderate hosts for SCN (we can find some henbit or deadnettle in 90% of fields). And a 2005 U of IL survey indicated 83% of IL fields have soybean cyst nematode populations high enough to significantly hurt yield. One of the best ways to manage cyst nematodes is to manage the soil population. Consider fall applied residuals as one management tool.

Improve in-crop Roundup Original Max/ PowerMax activity on tough to control weeds. Were emerged weeds harder to control this year compared to years past? Did marestail, lambsquarter, morningglory, giant ragweed, barnyardgrass or fall panicum give you fits? Fall or early spring residual herbicides can help your in-season weed control products work better.

Minimize the field's attraction to black cutworms and armyworms. Residual herbicides will reduce the number of winter annual weeds and thus fields will not be attractive to these pests.

Ceres Solutions has several tried and true weed control programs with residual herbicides for fields going to corn or soybeans in 2009. We can start applying soil residuals soon.

In September concentrate on corn stalks rotating to soybeans first and use the highest recommended rates of Scepter or Canopy EX for your given area. Be sure to add 2.4-D to all applications. Simazine applications on fields rotating to corn would be best started in October, however scout before application to ensure that no grass has started to emerge. Burndown programs with no residuals should be applied in late October. See your Ceres Solutions Professionals for product and rate recommendations.

Cool Temperatures Impact on Soybean Yield and Maturity

By Shawn Casteel, Purdue University—Fall officially arrives in two weeks, but we have felt the fall weather for what seems like two months across most of Indiana. The combination of delayed planting and decreased heat unit accumulation raises concerns for the yield and the maturity of the soybean crop.

Yield of First-Crop Soybean The late planting of soybean reduced the probability of attaining the maximum yield in a normal year. Favorable environmental conditions—timely precipitation, good sunlight, and heat unit accumulation—could have provided the ingredients to recover from late planting (as we have experienced in years past in southwestern IN). However, cool temperatures in July added insult to injury and probably reduced the number of flowers initiated and pods retained, especially in the late-planted soybeans. Flower initiation, pod set, and pod retention was reduced in a study of a determinate soybean that was exposed to 50° F for one week at various reproductive stages (Musser et al., 1983b). Fortunately, the indeterminate soybean grown in the Midwest provides some flexibility and adaptability for flowering and pod set. Many areas in the northern third of Indiana were planted in a timely fashion, but received little precipitation in July. The severity of the water stress was minimal in these areas due to the sluggish plant growth (vegetative and reproductive) that resulted from cool temperatures. The yields for this year will not be bin busters, but the weather forecast for the following two weeks is promising for seed fill in first-crop soybeans.

Maturity of First-Crop Soybean Late plantings have historically delayed maturity (and ultimately harvest) on a ratio of 3 to 1. Many fields across Indiana were planted three weeks late, which would delay maturity by approximately one week. Cool temperatures during reproductive growth have probably caused greater delays in maturity. For example, chilling (50°F for one week) during reproductive initiation of a determinate soybean delayed anthesis by one week (Musser et al., 1983b). The combination of late planting and cool temperatures during reproductive stages has probably delayed the soybean crop 7 to 10 days in the northern third and 14 to 21 days in the central and southern areas compared to a “normal” year.

The majority of first-crop soybeans are at R5 (initiation of seed) to R6 (full seed). An average soybean at R5 and R6 will mature to R7 (initiation of physiological maturity) in approximately 33 and 18 days, respectively, and could be prolonged with cool temperatures. However, the weather forecast in the coming weeks calls for daily highs in the upper 70s to low 80s and daily lows in the 50s. Soybean maturation should progress steadily over the coming weeks. In fact, late maturity group 2 soybeans are senescing and dropping leaves in west-central and north-central Indiana. Soybean harvest will be in full swing in October, which raises some concerns for planting wheat which will be addressed in a follow-up article.

Yield and Maturity of Double-Crop Soybean Many producers in the northern and central regions of Indiana rolled the dice and planted double-crop soybeans near the planting cutoff date (anecdotally determined to be 90 days prior to the first 32°F frost). The southern regions of Indiana have a wider window for adequate heat unit accumulation prior to fall frosts and freezes than the northern and the central regions. Generally, the first fall frost of 32°F occurs around October 6 to 13 in the northern third, October 10 to 15 in the middle third, and October 14 to 23 in the southern third (~October 25 in southwestern corner) at a 50% probability (Purdue Corn and Soybean Guide, 2009). A hard freeze of 28°F occurs approx 10 days later than the 32°F frost.

Double-crop soybean growth stages are across the board from R1 (flower initiation) to R5 (initiation of seed). The time needed for the soybeans to mature is limited, especially in the northern and central areas. For instance, double crop soybeans at R3 (pod initiation) will take approximately 50 days to reach R7, which would be October 30. This would be about 5 to 7 days after the first hard freeze of 28°F in the northern and central areas of Indiana. Seeds in green pods (~65% moisture) were injured at 28°F; whereas, seeds in brown pods (~35% moisture) were not injured at 10°F (Judd et al., 1982). The risk for seed injury, seed quality degradation, and yield loss decreases as soybeans move from R6 to R7.

Fungal Ear and Stalk Rots—by Suzanne Bissonnette, U of IL

Given late July and August weather, it is essential to be wary about Diplodia and Fusarium ear and stalk rots. We've had a lot of moisture, and ear and stalk rot fungi find that situation invigorating. Although the season should be winding down, late planting has led to later-maturing fields again this year. This has many producers worried about ear and stalk rots and seed germinating on the cob. Diplodia and Fusarium ear rot are our most typical ear rots in a nondrought year. And both Diplodia and Fusarium also can cause stalk rots.

Fusarium ear rot is characterized by pinkish to salmon-colored fungal tissue growing on the kernels. The fungus can be scattered on the cob or, often, seen toward the middle of the ear. Fusarium ear rot produces mycotoxins called fumonisins. Fusarium is favored by hot and dry conditions at pollination and high humidity. So while it is a disease endemic to our area, weather conditions were not exceptionally conducive to its development this year.

Diplodia ear rot, on the other hand, has had an optimal season for development. Diplodia ear rot is first noticeable in the field by a bleached appearance of the husk. When you peel back the husk, you see a white, fluffy fungus. The good news is that the Diplodia fungus will not produce toxins in the grain; the bad news is that kernels will be very lightweight, shriveled, and of very poor quality. Diplodia will likely be our most common ear rot this season.

What is the right moisture at which to harvest corn that has had fungal ear rot problems? The answer really depends on several important issues. First, what ear rot do you have in the field? Second, what weather is expected? Ear rot fungi will continue to develop in the field or in storage at moisture above 18%. If dry weather is expected, you can try to save some drying costs and leave the grain to dry a bit longer in the field. If you have moderate infection, though, and wet weather is expected, harvesting and drying to at least 18% is probably your best option.

Do you really have to dry to 18% moisture? Well, that depends on what you are planning to do with the grain. If you are planning on long-term storage, you actually should get the moisture down below 15% to 16%. Diplodia is not your biggest worry for storage, but the many species of another of our ear rots, Aspergillus, produce very serious grain toxins, including aflatoxin, and are a concern as they like to grow from about 14% to 18% moisture.

Diplodia, Fusarium, and many other fungi also cause stalk rots in our area. They produce symptoms such as white, black, and pink stalk discoloration, but their main impact is decreased standability

Scouting for stalk rots is a fairly easy endeavor. Evaluate 20 plants at each of five locations in a field. Begin scouting when kernels are at 30% to 40% moisture. You can use either of two methods to evaluate stalk integrity. The first is to lightly grasp the stalk at waist level and push it about 15 degrees from the vertical. A second method is to pinch the base of the stalk below the first node. Stalks that lodge or collapse when pinched should be marked positive for stalk rot. Fields can endure stalk rot incidence up to 10%. However, incidence above 10% to 15% calls for an early harvest to prevent further damage and lodging. You can investigate ears for ear rot just by peeling back the husk at the same time you are scouting for stalk rots.

Grain Update

USDA Summary—Sept 11,2009

Estimates in Million Bushels

Corn	**Sept USDA—09/10**	**Augy USDA-09/10**
Carry-in	1695	1720
Production	12,954	12,761
Total Supply	14,660	14,496
Feed and Residual	5350	5,300
Ethanol	4200	4200
Exports	2200	2100
Total Use	13,025	12,875
Carry-out	1,635	1,621
Soybeans		
Carry-in	110	110
Production	3245	3,199
Total Supply	3366	3,320
Crush	1,690	1,670
Exports	1,280	1,265
Seed	94	94
Residual	81	80
Total Use	3145	3109
Carry-out	220	210
Wheat		
Carry-in	667	667
Production	2,184	2,184
Total Supply	2,961	2,961
Food	955	955
Seed	78	78
Feed & Resid	235	235
Exports	950	950
Total Use	2218	2218
Carry-out	743	743

Soybean Drive-by cont.

SDS – leaves are quickly defoliating but some leaves with the irregular bright yellow spots and brown interveinal patters. When you split the tap root, it is gray in color and the pith of the stem is bright white.

BSR – leaves are also quickly defoliating on this one as well. On this when you look at the bottom of the stem it will have a “greasy” appearance, when the stem is cut, the pith will be chocolate brown just like a buckeye.

Phytophthora – leaves will cling to the plant and will fold down, the tell tale sign is the canker that comes from the soil line up the plant.

Stem canker – leaves will also cling, but here the canker is only at that third or fourth node of the plant, and the bottom of the plant – including root system is healthy.

Charcoal rot – some defoliation will begin and early dying of the plants but the tap root will have a peppery appearance often marked by dark lines. This can extend for a short distance up from the soil line.

And yes, you can have more than one pathogen hitting an individual plant at one time, this is Ohio (and also Indiana).

Fall Fertilization Cont.

the needed fertilizer to ensure soil test levels are adequate for the intended crop or crops there is no difference between annual and applying fertilizer every two years. However, if you prefer to apply two crops worth of nutrients in one year, it is better to apply it to the corn crop and allow the soybean crop to be the residual feeder. An annual application is most effective when soils fail to build up (sandy soils and K) or the potential for nutrient fixation in the soil is high.

Is a fall application of P and K better than a spring application? Again timing does not make a difference in the availability of these nutrients in typical Illinois soils. A fall application is often preferred because more time and equipment are available, soil compaction problems tend to be less because soils are typically drier in the fall, and P and K applications combined with tillage operations are more feasible in the fall. One potential drawback for fall applications is the fact that the nitrogen accompanying P in MAP and DAP is more susceptible to loss. However, the amount of N present in these applications is not very high, and the benefits of fall application typically outweigh any small N losses that might occur.

Note from the editor: For successful fall nitrogen applications: only use anhydrous ammonia; apply in late fall after soils cool to 50 degrees F and continue to cool: use a nitrification inhibitor; avoid soils that are more prone to wetness or leaching. Urea and 28 or 32% N (UAN) nitrify too quickly in spring which increases the chances for loss.

Reddish Purple Corn Plants

By Bob Nielsen, Purdue -Seems like every August, about mid-month or later, some curious farmer calls his local agronomist to complain that he is puzzled over the preponderance of puzzling purplish plants proliferating in his production paddocks. Unless you are an Ohio State or a Nebraska football fan, the sudden appearance of reddish plants in your fields late in the season can be a bit disconcerting.

As I've indicated in an article about early-season purpling in young corn, purpling of corn plant tissue results from the formation of a reddish-purple anthocyanin pigments that occur in the form of water-soluble cyanidin glucosides or pelargonidin glucosides (Kim, 1998). A hybrid’s genetic makeup greatly determines whether corn plants are able to produce anthocyanin. A hybrid may have none, one, or many genes that can trigger production of anthocyanin. Purpling can also appear in the silks, anthers and even coleoptile tips of a corn plant.

Most researchers agree that these pigments develop early in the season in young plants in direct response to a number of stresses that limit the plants' ability to fully utilize the photosynthates produced during the day. These stresses include cool night temperatures, root restrictions, and water stress (both waterlogged and droughty conditions). Since the anthocyanin occurs in the form of a sugar-containing glucoside, the availability of high concentrations of sugar in the leaves (photosynthesis during bright, sunny days) further encourages the pigment formation. If fields are stressed by other factors such as soil compaction, herbicide injury, disease damage, or insect injury, the purpling becomes even more pronounced.

Late in the season, the explanation for the production of these reddish-purple pigments is fundamentally the same (an abundance of photosynthetic sugars in the stalk and leaves) though the fundamental cause of the sugar buildup is different. Late in the season, stalks and leaves will turn reddish-purple when kernel set on the developing ear is minimal or non-existent (i.e., barren ears). The presence of a partially or totally barren ear represents a tremendous reduction in the consumption of photosynthates being generated by that great, big solar-powered photosynthetic factory we call a corn field. Thus, puzzling purplish pigmented plants can develop in response to poor pollination success, severe kernel abortion, severe silk-balling, or arrested ears of various shapes and sizes.

While purpling is not the cause of the problem, it's existence certainly represents the proverbial "red flag" that signals serious problems with ear size or kernel set.