To subscribe or unsubscribe, please send your request to the editor at rtaylor@udel.edu

Comments, suggestions, and articles will be much appreciated and should be submitted at your earliest convenience or at least two weeks before the following dates: February 28, May 30, August 30, and November 30. The editor would like to acknowledge the kindness of Mr. Todd White who has granted us permission to use his scenic photographs seen on the front cover page. Please go to www.scenicbuckscounty.com to view more photographs.
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Many corn fields on the Eastern Shore and in Eastern Virginia showed possible nutrient
deficiency symptoms this past spring with “yellowing” and stunted corn
plants. Some of the deficiencies we have seen include nitrogen, boron, magnesiunm, sulfur, and zinc. Heavy,
leaching rainfall this past winter and dry conditions this spring aggravated deficiency issues and corrective action
may be necessary. Rainfall patterns for the past year and 30-year averages are illustrated in Figure 1 for the Richmond
area and Figure 2 for the Eastern Shore. Deficiency symptoms range from minor
to severe and are highly dependent on previous fertilizer sources used, soil
texture, soil pH, and weather. Therefore, no blanket fertilizer recommendation for all fields can be made. Fields should be scouted early to catch problems before yield potential is lost.

Be sure to take a copy of your soil test to the field when you are scouting visually, as it can offer hints to what may be the underlying deficiency issue. For instance, zinc is often recommended on soil tests but not applied, so you should first look at these nutrients for answers.
Care should also be taken when using visual deficiency symptoms to diagnose crops. Visual characteristics are a start, but may be misleading as many nutrients exhibit similar symptoms that can easily be confused. For instance, many fields appear stunted and yellow and are diagnosed as a nitrogen deficiency when in fact sulfur deficiency is the main culprit. This scenario has been especially true this spring as above normal leaching rains has moved soluble nutrients, such as nitrogen and sulfur, below the surface soil horizon.

The best way to diagnose nutrient deficiencies is to use tissue and soil testing. Many private labs can email or fax results back within a day or two after sample submission. For around $25, tissue tests will give exact nutrient concentrations and pinpoint what nutrients may be in short
supply. Soil tests will show what the plant is actually able to secure from the soil in this growing season. For more accurate recommendations, submit a soil sample along with your tissue tests. For corn less than 12 inches tall, take 30 samples from the whole aboveground portion across the entire field. Between 12 inches tall and tassel, sample the upper-most fully developed leaf (leaf has a “collar”). Overall, the time and money it takes to test your corn is small compared to the fertilizer inputs you have already or will potentially invest.

To correct nutrient deficiencies, macronutrients (nitrogen, phosphorus, potassium, magnesium, and sulfur) and micronutrients (zinc, boron, and manganese) important for corn production can be mixed into your side dress application when plants are knee-high. For farmers not applying side dress applications or are past this stage, foliar feed applications can be made and possibly incorporated with other maintenance sprays. Be sure you consult your tissue test recommendations, Virginia Cooperative Extension, or your local fertilizer dealer for recommended rates and products. Remember – Too much is not always better and source is important. Some nutrient sources have the potential for leaf burn which is not desirable for a plant already under nutrient stress. The correct source and rate are critical to efficiently correcting the nutrient deficiency.

As always, the best way to correct a deficiency is to avoid it in the first place. All fields should be routinely soil sampled and fertilizer applied based on your soil’s yield potential. Using Virginia Tech’s soil testing laboratory, your soil’s yield potential will automatically be calculated if you put your soil series on the soil sampling sheet instead of yield goal. Proper nutrient management can save more than headaches, it can increase yields by determining the correct nutrients and amounts of each needed on a field specific basis, reduce applications of unneeded nutrients, and importantly, increase profits. For more information on proper fertilizer use and placement in field corn, consult Virginia Cooperative Extension publications #424-027 (nitrogen and phosphorus), #452-702 (macronutrients), and #452-701 (micronutrients).

Those Pesky Interveinally Chlorotic Corn Leaves

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During the past two growing season, I’ve tried a number of remedies for an early season common problem on field corn. It seems that more and more corn has been showing distinctive interveinal chlorosis (yellowing between the veins) on the upper leaves. A number of theories have been bantered about as to what these symptoms represent and if they are even meaningful from a final yield point of view. Farmers who have kept track of the problem areas and who have yield monitors have not reported lower yields are necessarily associated with these symptoms. It may be that small yield effects do occur but so far the yield effects mostly have been very subtle. Up to now, I’ve tried foliar applications of manganese, zinc, copper, iron, boron, magnesium, and sulfur (usually as a component with one of the previous cations). None
of these foliar-applied nutrients have lessened the symptoms. The corn does tend to grow out of the symptom when it reaches the rapid growth phase around side-dress time.

I will continue to look at this situation and try some soil-applications since some work Dr. Greg Binford did last year seemed to indicate that soil applied sulfate may help. Another possibility since we’ve had two very unusual springs is that on early-planted corn that received substantial amounts of cold rain, root system restrictions from some production factor may be limiting nutrient uptake leading to smaller, yellowed (interveinal yellowing) corn. For the most part, warm temperatures and corn reaching the rapid growth phase of development seems to be initiating the recovery of the crop.

If you’ve seen this type of problem in some of your corn fields, please take time to pass along to me or your Extension agent as much information on your production practices and weather for these areas as possible so we can try to understand more about this problem. If you have a yield monitor on your combine and can yield check problem areas versus nearby good areas, we would appreciate learning if your yields have been affected.

June 30th Virginia Cooperative Extension will Retire 75 Years of Experience in Farm Management and Marketing

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June 30, 2010 marks a time when we will say goodbye to three stalwarts in the farm business management program. Eric Eberly, Mike Roberts, and Bill Whittle will all leave their current positions as farm business management extension agents. They have all made major contributions in support of Virginia agriculture. I have relied on them, and they have willingly met the programmatic needs of our clients. As resources have declined for educational programs they have provided programmatic leadership, established subject matter expertise, and obtained grant funds to meet the needs of Virginia’s agricultural industries. It has been a pleasure to work side-by-side with them over their long careers.

Eric Eberly, currently housed at the Southern Piedmont AREC, started as a farm business management extension agent in 1980 and has worked in the Virginia’s Southern Piedmont his whole career. Eric has always been the go-to-person on farm taxes, tobacco costs of production, computerized farm records, and enterprise budgets. Since 1993 he has taken the lead in developing a standard format for the 150 plus crop, livestock, and vegetable budgets. These are the cornerstone of many business management programs in Virginia and around the Southern region. Farmers and educators from around the U.S. use these budgets on a daily basis. Eric has worked tirelessly to develop tools and analysis that farmers can use on a daily basis and he is thorough in his analysis. If I needed a spreadsheet reviewed for accuracy, Eric was my first choice. Southside Virginia has benefited from Eric’s understanding of what it takes to make an
Eric plans to take the summer off and then return on project funds to support the Use Value Taxation program by keeping our enterprise budgets up-to-date. I look forward to his continued support.

Mike Roberts currently working out of the Prince George Extension Office started as a farm business management extension agent in 1997. Mike has been instrumental in seeking out grant funds to support extension programming and use of technology to complement statewide programming. Mike jumped in and took over education programming for commodity marketing and outlook after the retirements of Dr’s Kenyon and Purcell. He volunteered to pick up the task of weekly writing and publishing the commodity marketing newsletter and retained a vast audience. Mike put video conferencing technology to use in getting experts from around the U.S., France, and Brazil to conduct interactive outlook updates for Virginia farmers and agribusinesses. This was achieved via partnering with the Virginia Community College System and Virginia Department of Transportation to provide the technology backbone to reach audiences across Virginia and the world. Mike will start a new extension career as an Extension Associate for Dairy Programs in the Agricultural and Resource Economics Department at North Carolina State University. This position will provide a new challenge and get him closer to his grandchildren. Good luck in the new job, Grandpa Roberts!

Bill Whittle is currently working out of the Page County Extension Office. He started his extension career as a farm business management extension agent in South Carolina and later in Virginia in both Bedford and Page Counties. In 1996 he joined the Farm Business Management staff of Virginia Cooperative Extension. Bill has consistently placed the needs of Virginia’s farmers at the forefront of his educational programs. He has been instrumental in the development of the Dairy Management Institute, leasing and custom rate surveys used by farmers throughout the Valley and the rest of Virginia as a one-of-a-kind information source. Most importantly he has been the driving force behind educational programming in farm transition planning. Bill helped obtained grant funds, provided leadership, led training for numerous agents to insure the success of the farm transition program. The folks in the Valley have had a tireless public servant working side-by-side as they have faced some of the best and worst economic conditions of their lifetime. I am also very grateful for his passion to get me at least six articles a year for publication in this newsletter. Bill will begin his retirement in July. He tells me that he might take up fly fishing, sit and think for awhile, hike the Appalachian Trail, and/or something else. He plans to start the strategic planning process after June 30.

Thanks to all of you for your excellent work, help, and friendship. Best of luck in the next phase of your lives.
Former Agricultural and Applied Economics Department Head Dies at 75

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Herbert Horst Stöevener, 75, of Blacksburg, Virginia, passed away on Monday, May 10, 2010, at his home in Blacksburg. Dr. Stöevener is survived by his son, Ralph Gregory Stöevener, of Platteville, Colorado; his daughter, Karen Annette Stöevener, of Blacksburg; his sister, Leni Alt, of Goslar, Germany; three granddaughters, Cassie Anne Stöevener, Morgan Leigh Stöevener, Kersten Leni Stöevener; and one great grandchild, Ryan L. Stöevener-Lucas.

Herb Stöevener came to Virginia Tech in 1980 as department head. In 1991 he assumed the position of Special Assistant to the Provost for International Programs. Professor Stöevener conducted research in natural resource economics focusing primarily on issues in environmental management, the measurement of publicly provided recreational benefits, and the economics of land use policy. He taught graduate and undergraduate courses in these subjects and in the theory of welfare economics. Professor Stöevener was a Fellow of the American Agricultural Economics Association. He received the 1973 AAEA award for Published Research, in 1977 the AAEA award for Quality of Research Discovery, and the 1982 AAEA award for Quality of Communication.

Making Hay on Shares: What is a Fair Division of the Crop?

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Hay making is at its peak as this newsletter goes out and many Virginia farmers are contending with the annual ritual of monitoring weather forecasts, making hay, and rushing to get bales removed from the fields. While many folks choose to keep their own equipment and deal with the challenges and benefits of making their own hay, others look to their neighbors to provide the equipment and labor to get a hay crop made.

Often, the question arises: What is a fair division of the hay crop? This article attempts to identify the primary costs of producing the hay and thus illustrate how two parties can arrive at their own equitable share agreement.
The orchardgrass and red clover hay budget featured in this article can be found at: [http://pubs.ext.vt.edu/category/enterprise-budgets.html](http://pubs.ext.vt.edu/category/enterprise-budgets.html). It is representative of several hay budgets available from Virginia Cooperative Extension. The table below summarizes the itemized costs featured in the detailed hay budget. The blank column provides the opportunity for the reader to insert their own cost assignments to arrive at an appropriate crop share arrangement.

### Orchardgrass / Red Clover Hay (costs on a per acre basis)

<table>
<thead>
<tr>
<th>Expense Item</th>
<th>Cost (per acre)</th>
<th>Landowner</th>
<th>Hay Maker</th>
<th>Your Landowner Estimates</th>
<th>Your Hay Maker Estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seed and Establishment¹</td>
<td>$43.39</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fertilizer</td>
<td>$169.01</td>
<td></td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lime</td>
<td>$10.73</td>
<td></td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chemicals</td>
<td>$0.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Land Ownership Costs²</td>
<td>$26.90</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Harvest Variable Expense³</td>
<td>$57.73</td>
<td></td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Harvest Fixed Expense³</td>
<td>$36.46</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Cost</strong></td>
<td><strong>$344.22</strong></td>
<td><strong>$81.02</strong></td>
<td><strong>$263.20</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Share</td>
<td>24.00%</td>
<td>76.00%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

¹Assumes improved stand with a 7-year life.
²Land Ownership Costs per acre here are: Opportunity Cost of foregoing land rent = $18, Taxes under land use assessment & Insurance = $4, Interest expense at 4% for 6 months = $4.90.
³Equipment Expenses assume fuel costs at $2.50 / gallon, new equipment with a life of 8 – 10 years for hay implements and 12 – 16 years for tractors and harvesting over 350 acres of hay annually.

It is essential to note that this table represents just one of many ways the costs of hay production can be shared and it is not intended as a recommendation. In my years of work, I encountered a common hay-share among many farmers where the landowner receives one third of the hay crop and two thirds to the hay-maker. This division is coming into question as expenses for fertilizer, fuel, and equipment parts and maintenance have significant increases.

The key point is that hay production represents a significant expense to the livestock or dairy producer. Crop sharing can be an excellent means by which resources are shared and efficiencies are gained. An examination of itemized costs can insure fair treatment of both parities and success for both farming operations.
Over my years in Extension as a farm business management agent I have witnessed many successful and some unsuccessful Valley farming operations. Taking a page from late night talk shows I am going to give you my Top 11 management pitfalls. Except for the first, these are in no particular order but you should notice rather quickly that each pitfall is entwined with the others.

1. Not knowing your Cost of Production: COP, or what it costs you to produce one unit is the lynchpin for profit. Every management decision must be weighed against how it affects your COP. Too few farmers know their cost of production and if you do not know your COP, can you truly be considered in the business of farming?

2. No plan for transferring the farm to the next generation: Life happens, but without adequate planning and preparation it may not happen the way you desire. Transitioning the farm is a long-term, on-going and arduous process encompassing every segment of the farm and family. You need to start early, involve everyone, and modify as life provides changes.

3. Inadequate financial recordkeeping: If you keep your financial records only for tax preparation, Uncle Sam appreciates your efforts but you have given up a management tool for determining COP and making profitable decisions. Without adequate records for making decisions your outcomes are based on guesses and wishes.

4. Lack of a clearly defined business plan: Farmers are great at planning day-to-day production activities but long-term plans get lost in the every day work. Planting the crop, breeding the cow, and marketing the crop must happen, but determining how each cog relates to profitability will keep you in business for the next generation.

5. Lack of Communication: Farmers tend to be uncommunicative, but family businesses have many official and unofficial partners with a stake in the business. It is important to keep these partners (spouse, children, employees, lender, equipment dealer, farm supply dealer, etc.) aware of what you are doing at least to the level of their involvement.

6. Avoiding or deferring taxes: The desire to not pay taxes leads to tax decisions that may have long-term negative implications rather than decisions that manage for long-term profitability. We often forget that the tax bill will come due some time in the future.

7. Lack of financial reserves: Both businesses and families lack the financial reserves
necessary to make weathering tough times less difficult. This current economic downturn has changed the landscape and businesses will need to depend on these reserves in conjunction with tools provided by their lender.

8. Not managing family living expenses: The family can be a black hole in sucking up money. The only way to manage that black hole is to know what it costs your family to live and then to manage your resources.

9. Following your neighbor: Farming operations are different and the factors that drive your neighbor's decisions are not the same factors you deal with. Why should you follow him? I bet he did not get to be successful following his neighbor.

10. Jumping on the latest/newest/hottest enterprise: The learning curve for new enterprises is steep and expensive. A lot of homework needs to be done before launching a new enterprise, and it is rare to see that homework done. Because an enterprise is successful somewhere does not mean you can make it work here, but the reverse is also true. The right idea, coupled with the right resources, markets, and management traits are essential in raising an idea from the kitchen table to a profitable enterprise.

11. Not training the next generation: Farmers are good at teaching the younger generation about production but less so about financial management. This has a lot to do with a lack of communication, murky long-term plans, and an unwillingness to share control. If the farm is going to survive for generations, that training must occur.

Valley farmers are good at what they do but as with any business they need to constantly strive to do better. The stress of this down economy has not spared any farm and has highlighted any shortcomings in financial management. Most Valley farms will survive these times but only the most efficient will prosper.

**The Management Calendar**

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A few thoughts on management and planning: The position I have requires planning for the expected, for example, this newsletter, and the unexpected, a visit from my department head asking me to chair a committee. Regardless of our job or position we have to plan to meet the expected and the unexpected. The last statement, planning for the unexpected, sounds, well silly. How can you plan for the unexpected? How do you plan for a 20% drop in prices or rapidly escalating feed prices driven by the demand for bio-fuels? To answer, I’ll quote Dwight D. Eisenhower, who said, "The plan is useless; it's the planning that's important." So even though
you spend months working up a superb business plan that lays out in detail how the business will succeed, “it may be useless” when the uncertainty of normal life occurs. Often the focus of getting the plan finished distracts us from the most important task when creating a plan; that is, knowledge and understanding how the business may respond to changes driven by unforeseen events. The key is the mental exercise you get from planning and developing what-if strategies. Working out hypothetical responses to problems (a 20% drop in net income) and opportunities (a long term lease is available for the 300 acres farm next door) will give you the mental and fiscal agility to make sound decisions. The time spent planning is an investment in planning for the unexpected and the long-term survival of your business. Listed below are useful resources for agricultural and small business planning:

- BeginningFarm.org provides links to a number of useful sites at: http://beginningfarmers.org/farm-business-planning/.
- Extension is constantly adding new resources so visit their site at http://www.extension.org/ and search on “business planning.”
- Visit the Ag Risk Library at the Center for Farm Financial Management under the header “Strategic and Business Planning” http://www.agrisk.umn.edu/Library/Topics.aspx?LIB=AR
- Our own Alex White has a number of resources for small business planning at http://www.extension.agecon.vt.edu/smallbusiness.html

Listed below are the items that need to be included on the farm business managers' calendar for spring of 2010:

- Half the business year will soon be behind us and a six-month financial record check-up is in order. Updating your records through the month of June allows you to quickly gauge financial progress by comparing the farm's actual expenses and income to your budgeted amounts. If you did not develop a budget, compare your mid-year expenses and income to half the items reported on your 2010 Schedule F. Flag any items that are different from budgeted amounts. These differences are not necessarily problems, just items that need to be examined and explained.
- Watch your line-of-credit and be sure to keep in touch with your lender. They all know that we are in a time of uncertain returns. Yet, it’s just good business practice to keep them informed of major changes and that you are managing the situation.
- Production records for livestock and crops should be updated for the first half of the year. Look for big changes from last year, and make sure to cross-reference these with production expenses.
- Even with the time constraints of summer activities, try to plan and hold regular staff meetings with family members and employees to discuss work plans and set priorities for the next day/week. Consider brainstorming about alternative ways to deal with problems. Use some of the time to help discuss positive outcomes of previous plans, and recognize individuals for being creative and doing a good job.
- Checking your credit rating in July should become an annual event. Independence Day should remind you that you should be independent from identity theft and credit mistakes. All individuals and business owners should annually check their credit rating. Additional information on your rights to access your credit report and links to the site for obtaining a
A free copy of your credit report can be found at the Federal Trade Commission’s (FTC) website at [http://www.ftc.gov/freereports](http://www.ftc.gov/freereports). The FTC cautions consumers to make sure they use the correct site because there are “Imposter” sites.

Selective information available that might be useful for summer reading:

- A recent USDA Economic Research Service study reported that half of farm expenditures are spent locally and the entire report can be found at [http://www.ers.usda.gov/AmberWaves/June10/Findings/FarmExpenditures.htm](http://www.ers.usda.gov/AmberWaves/June10/Findings/FarmExpenditures.htm). It is worth reading and forward to local officials about the economic impact of agriculture on localities.
- Need a one-stop location for information about Virginia and all the other states? Then visit [http://www.ers.usdagov/StateFacts/](http://www.ers.usdagov/StateFacts/). The USDA State Fact Sheet site provides information on population, per-capita income, earnings per job, poverty rates, employment, unemployment, farm characteristics, farm financial characteristics, top agricultural commodities, top export commodities, and the top counties in agricultural sales.
- Orchardists and nursery tree growers that suffered from a natural disaster on or after January 1, 2008 and before October 1, 2011, can avail themselves of the Tree Assistance Program. For more information on the new TAP program, please contact your county FSA office or the website at [http://www.fsa.usda.gov](http://www.fsa.usda.gov).

**How Much Time Does it Take to Plant My Crops?**

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The old adage “time is money” is easily applied to the net profitability of many farms. The timeliness of planting, spraying, and harvesting of crops has a major impact on yields and quality. With this in mind, producers can find it easy to justify the purchase of larger equipment with the thought to speed up the planting, harvesting and spraying.
Most producers, however, are not able to accurately calculate the amount of time it takes to plant, spray, and harvest an acre of crops with their existing equipment. To do this, some questions need to be asked and answered. Is the existing equipment being used to its maximum potential during daylight hours? For example, on many cash-crop farms the producers start their day at 7:00 AM, take 30-60 minutes for lunch, and then work to 7:30 PM. After ~12 hours on a tractor seat, most producers are ready to call it a day. How many additional acres would be covered each day by operating the equipment in the field during lunch hours and from sunrise to sunset? An additional person will be required to keep the equipment moving during the extended days. Would there be an additional cost of labor to do this? On many farms, rescheduling the existing labor force can keep the equipment operating during the extended hours.

Many producers have the thought in the back of their minds that when it is time to upgrade their equipment, they will purchase a larger model “in order to get in and out of the field faster.” How much additional time will be saved by purchasing the larger model? What is the value of the time that was saved by the larger equipment? Can the value of the savings in time justify the increased cost of the larger equipment?

Over the years, I have watched a cash-crop farm (3,500 acres+), operated by three brothers, become extremely profitable. They maximized profits by always operating the equipment from sunrise to sunset, performing scheduled maintenance at proper times, and never buying oversized equipment to keep up with their neighbors. The brothers had a good teacher. On several occasions their father scheduled labor to keep a tractor plowing around the clock from Monday morning to Friday night. The only time that the tractor was shut off was to fuel and service the tractor. In his retirement, their father routinely cultivated from 4:00 AM to Noon as part of the early shift.

At the start of the cropping year, I would suggest that producers keep track of the time and gallons of fuel to plant and spray each field. This information can be easily written in a small pocket notebook. At the end of the planting season I would suggest transferring this information into a spiral notebook or saving the information in the farm’s computer. Later in the year, similar information will be collected for harvesting the crops. At the end of the year this information will be summarized.

A future article will discuss how this information can easily be used to develop a cost accounting program for your farm. My sister-in-law has developed and implemented a simple, quick, and accurate cost accounting program on their dairy/cash-crop farm. She has developed a system where she has “trained” my brother to spend a maximum of 5 minutes reviewing the bills that come in the mail each day. The system has worked well because my brother knows that he will not be fed dinner that day unless he reviews the bills! The program has been extremely successful because my brother carries a large tire around his waist! Best wishes for a safe and profitable year.
How Much Do Improved Forages Boost Pasture Productivity?

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Producers always hear about benefits of pasture renovation. In an extreme form, it involves complete replacement of existing pasture species with new improved forage varieties. The decision to do this is obviously a difficult one. Pasture renovation can be expensive, and benefits to productivity may be temporary or even nonexistent. Some interesting on-farm research recently addressed this issue. (Brink et al. 2010. Renovation and management effects on pasture productivity under rotational grazing. Online. Forage and Grazinglands doi:10.1094/FG-2010-0316-01-RS).

The authors chose five Wisconsin dairy farms that used a range of rotational grazing systems. Within each farm, they tilled up a strip of perennial grass and sowed a mixture of improved orchardgrass and meadow fescue varieties in 2006. Once established, they compared forage yield and quality in renovated stands to existing pasture. They also looked at two management factors. Management imposed by the producer according to his or her preferences, or recommended agronomic management. The recommended management was 50 lbs of urea applied in April and August in addition to any fertilizer used by the producer.

In the two years after establishment, improved varieties produced about 25% more forage (2.7 tons DM) compared with existing pasture (2.1 tons DM). Management effects (producer vs. recommended) were inconsistent between years. Forage quality was the same between the improved and existing pasture. Nor surprisingly, the biggest change in productivity was found on two farms that had mostly bluegrass and weeds before renovation. The other three farms had received a lot of N fertilizer and had more orchardgrass to begin with. On these farms, renovation with improved forages had minimal benefit. Animal performance was not reported.

It will be interesting to see if the renovated pastures remain more productive over the long term. A major drawback to complete renovation is the tendency for a pasture “revert” back to its previous species composition over time. Good, consistent management of renovated pastures is crucial to help delay such problems. Clearly though, pastures that have an abundance of unproductive species like bluegrass would benefit from a complete renovation.
2009 Soybean Cyst Nematode Survey Results

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Introduction

The soybean cyst nematode (Heterodera glycines) is the most limiting biotic factor of soybean production in Delaware. In 1993 and 1994 a major effort was made to survey the soybean acreage for the soybean cyst nematode (SCN) and determine the race composition of the SCN populations present at the time. The Delaware Soybean Board funded this project and the results demonstrated that roughly 60% of the populations that were race tested were race 3 and 30% race 1 and the remainder a mix of races 5, 7, and 9.

Since that time Roundup Ready® soybeans were introduced with a single source of resistance to SCN derived from a soybean plant introduction referred to as PI88788. At the time of the first survey we demonstrated a significant yield reduction in one variety trial where race 3 resistant soybeans were planted in a field known to be infested with race 1. This was the first indication that not all race 1 populations could be controlled with a race 3 or 3, 14 resistant soybean variety.

For the past 10 years SCN has not been identified as causing much yield loss because symptoms that were seen previously, namely severe stunting and chlorosis, only seem to be present when a susceptible variety is grown or high egg numbers combined with dry weather at planting occurs when a resistant variety is planted. During the 2008 growing season a small number of soybean fields had stunted plants, chlorosis, and SCN was present on the roots. All of these fields were planted with a Roundup Ready® variety with resistance to SCN. The difference in 2008 was that is was dry from planting through the first thirty days after planting. High SCN egg numbers and dry weather early are known to be very detrimental to early soybean growth and can produce stunting, chlorosis and yield loss.

Within the last 5 years there are indications that race 3 is no longer the predominant race. A small set of samples tested here and those sent to other institutions have tested as race 1. Since the majority of resistance in Roundup Ready® soybeans is from PI88788 which allows
reproduction of race 1 populations, these varieties may have reduced effectiveness in suppressing current SCN populations. Other control measures may be needed if the current population structure is no longer predominately race 3. No surveys of SCN have been conducted in Delaware since 1996.

Materials and Methods

Sixty-three soil samples from fields with known history of soybean production with or without known SCN infestations were sampled during the spring summer and fall. Thirteen samples were taken from New Castle County, 22 from Kent and 28 from Sussex. Fields were sampled randomly by taking approximately 25 soil cores in a zigzag pattern to a four to six inch depth and within the row if soybean stubble was present. Samples were placed in plastic bags and stored at 40°F until processed. *H. glycines* cysts were separated from the soil by the wet sieving method. A 250-cm³ sub-sample was taken from the well-mixed soil sample and suspended in water. The suspension was poured through nested 595-over 250-µm pore sieves. Cysts and debris retained on the 250 µm pore (60 mesh) sieve were washed into a large 100-ml polypropylene test tube and the water level increased to 40 ml. A stainless steel bit with 1-mm helical ridges attached to a variable speed stirrer was used to crush the cysts: the stirrer’s rheostat was turned to 6,000 rpm while the test tube containing the cysts was held gently against the rotating bit for 60 seconds. Contents of the tube were washed through nested 75-µm-pore (200 mesh) over 25-µm-pore (500 mesh) sieves. Eggs collected on the 25-µm-pore sieve were stained with acid fuchsin. After staining, the egg suspensions were standardized to 100 ml, stirred, and a 5 ml subsample was removed with a pipette for counting. Results were reported as number of eggs per 250 cm³ soil.

For race and HG typing, 14 samples were selected from Kent (4) and Sussex (10) Counties where there were at least >1,000 eggs/250 cm³ of soil (except for one sample from Kent County). Samples were sent by 2-day express to the University of Missouri Extension Nematology Laboratory for analysis. Populations were reared on susceptible soybean for 30 to 40 days in a water bath at 27°C to increase egg numbers and break any egg dormancy. Plant root systems were removed from pots, cysts were collected, and eggs were extracted for use in race and HG Type test. Female Index (FI) was calculated for each soybean line as follows: FI = (mean number of females on test soybean line divided by the mean number of females on the susceptible variety ‘Lee’ X 100.

Results

In this study, 63 soil samples were processed for egg counts. In all, 35 (55.6%) of the samples had detectable populations of SCN. The highest number of eggs detected was 11,448 eggs/250 cm³ soil, and the lowest was 72 eggs/250 cm³ soil.
Table 1. Frequency distribution of soil samples among classes of egg counts per 250 cm³ soil (0.5 pt)

<table>
<thead>
<tr>
<th>Egg Rating</th>
<th>NCC</th>
<th>Kent</th>
<th>Sussex</th>
<th>Statewide %</th>
</tr>
</thead>
<tbody>
<tr>
<td>None 0 eggs</td>
<td>13</td>
<td>14</td>
<td>1</td>
<td>44.4 (28)</td>
</tr>
<tr>
<td>Low 1-499 eggs</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>8.0 (5)</td>
</tr>
<tr>
<td>Moderate 500-1,499</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>11.1 (7)</td>
</tr>
<tr>
<td>High 1,500-4,999</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>17.5 (11)</td>
</tr>
<tr>
<td>Very high 5,000-50,000</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>19.0 (12)</td>
</tr>
</tbody>
</table>

Fifteen soil samples (42.8%) of the 35 samples that had cysts were sent for race and HG Typing.

Table 2. Table of Race/HG Tests for SCN populations collected as part of the 2009 SCN Survey.

<table>
<thead>
<tr>
<th>Sample #</th>
<th>Indicator Line – Female Index : FI = (mean number of females on test soybean line divided by the mean number of females on the susceptible variety 'Lee 74' ) X 100</th>
<th>HG type</th>
<th>Race</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Peking, PI88788</td>
<td>HG 1</td>
<td>2.5.7</td>
</tr>
<tr>
<td>30</td>
<td>0% 70%</td>
<td>70</td>
<td>1</td>
</tr>
<tr>
<td>31</td>
<td>18% 65%</td>
<td>64</td>
<td>2</td>
</tr>
<tr>
<td>33</td>
<td>1% 67%</td>
<td>73</td>
<td>5</td>
</tr>
<tr>
<td>42</td>
<td>1% 63%</td>
<td>73</td>
<td>2</td>
</tr>
<tr>
<td>44</td>
<td>0% 59%</td>
<td>73</td>
<td>5</td>
</tr>
<tr>
<td>48</td>
<td>0% 80%</td>
<td>67</td>
<td>1</td>
</tr>
<tr>
<td>49</td>
<td>2% 68%</td>
<td>58</td>
<td>1</td>
</tr>
<tr>
<td>50</td>
<td>2% 76%</td>
<td>63</td>
<td>1</td>
</tr>
<tr>
<td>51</td>
<td>11% 75%</td>
<td>63</td>
<td>1</td>
</tr>
<tr>
<td>52</td>
<td>7% 62%</td>
<td>74</td>
<td>2</td>
</tr>
<tr>
<td>54</td>
<td>2% 70%</td>
<td>72</td>
<td>2</td>
</tr>
<tr>
<td>57</td>
<td>1% 75%</td>
<td>61</td>
<td>2</td>
</tr>
<tr>
<td>58</td>
<td>0% 63%</td>
<td>85</td>
<td>1</td>
</tr>
<tr>
<td>59</td>
<td>7% 44%</td>
<td>67</td>
<td>5</td>
</tr>
<tr>
<td>63</td>
<td>15% 67%</td>
<td>68</td>
<td>2</td>
</tr>
</tbody>
</table>

The race composition has changed dramatically since 1996. Seven race 1 populations (47%) have been identified, 5 race 5 populations (33%) and 3 race 2 populations (20%). The other alarming result is the high female index (FI) for these populations on PI88788. The range is from 44-80% of the susceptible variety. The average FI is 67.

Discussion

These results indicate that under adverse growing conditions and high initial egg numbers, stunting and yield loss would be expected if a race 3, 14 resistant variety with PI88788 as its source of SCN resistance is grown here in Delaware. Consequently, growers may need to plant soybean cultivars derived from non-PI88788 resistance sources to successfully manage soybean...
cyst nematode in the future. This is a problem since there are none that are Roundup Ready® that can be planted at this time. There is little interest in growing conventional soybeans and the varieties that could be grown here are not available in sufficient quantities to satisfy the immediate need. Growers are going to have to manage SCN by judicious variety selection and rotations with non-host crops for the immediate future.

Acknowledgements

This work was supported in part by a grant from the Delaware Soybean Board and is gratefully acknowledged. We thank also Bill Cissel and Joanne Whalen for identifying fields for sampling and collecting samples. Consultants Tom Coleman and Rob Ekholm also provided several soil samples and we thank them as well. We would like to acknowledge the excellent work that Bob Heinz, lab director of the University of Missouri Extension Nematology Laboratory, did performing the race/HG testing on the Delaware SCN populations.

References


Managing Compaction on Pastures when Soil Moisture Content is High

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During the rather warm weather of this past weekend I spent a couple of relatively uncomfortable nights when our new air conditioner wouldn’t start. Although this can hardly be called earth shattering news, it did bring to mind how we all seem to have forgotten the days when AC was not available and wasn’t built into our tractors as standard equipment. Following the uncomfortable weekend, I was asked if it is important to consider how wet some pastures or areas of pastures are when choosing the tractor to use when dragging a chain drag across the pasture to break up manure piles. Although we might be tempted to use whatever sized tractor we have that has AC and all the comforts of modern equipment, it is important to keep in mind
that we should use only as large and heavy a piece of equipment as is necessary to complete the
job. In the case of dragging pastures to spread manure piles to prevent the piles from killing the
grass/legume beneath them, a small tractor or ATV capable of pulling the chain drag is all that is
needed.

Although grazing animals can contribute to compaction issues, I think it is good management
to minimize all other sources of compaction. Mowing recently grazed pastures or dragging them
to redistribute the manure are excellent practices in their own right. Mowing leftover spring
grass removes seed heads and stimulates the grass to produce new vegetative tillers that are high
in nutritive value. Spreading manure helps it to dry out and get into contact with more soil
surface area to encourage rapid decomposition. Dragging manure spreads the nutrients over
more land area and removes manure piles that can suffocate or shade out the underlying grass
creating space for weed encroachment. When piles are not broken up and distributed around the
pasture, animals selectively graze away from the grass in and around the pile causing reduced
utilization of the pasture.

Choosing to use the biggest and perhaps newest heavy duty equipment can make the job of
mowing or dragging pastures more tolerable but in the process of doing a good management
practice you end up cancelling all the good you will be doing by causing more compaction
problems especially in the wetter areas of a pasture. Compaction and especially deep
compaction issues are very difficult to resolve without a total pasture renovation in which the
pasture is deep ripped, tilled, and replanted. Compaction issues tend to be cumulative until poor
productivity or weed competition becomes severe enough to demand a solution, total pasture
renovation. So, take out the sun screen or pull on a large hat, wheel out the four wheeler or one
of the older, smaller tractors and avoid more compaction!

Hay and Pasture and Potash

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Although it’s a little earlier than normal, I think it’s time to start thinking of applying your
spring potash (K) and phosphorus (P) fertilizer to your pasture and hay fields. For the hay fields,
you will want to wait until after the first harvest but I’ve seen a number of fields at heading
(grasses) or late bud (alfalfa) which is a good time to harvest a good to excellent quality hay. For
those more interested in tonnage, you’ll be holding off harvest for a few more weeks but you can
still plan ahead for when your fields will be ready to fertilize with P and K and another shot of
nitrogen (N). The warm weather of the past week and the period of very warm weather earlier
this spring have orchardgrass and many other cool-season grasses heading out already. Early
May is also on average a time when we have the greatest chance of a period of warm sunny
weather long enough to dry hay.
Potassium or potash is a very critical element that helps plants tolerate the stresses of heat, drought, insects, and diseases that attack cool-season grasses in the summer. Although the price of K is high at the present time, the corresponding benefits of K fertilization will help you afford the cost of fertilizing with K. Many growers have chosen to either lower their K fertilization rates or eliminate them completely during the past couple of years when the price of fertilizer has been very high. If you have a current soil test, check the recommendations for how much K might be needed. If your soil test is not current you should get one as soon as possible to determine how much K you should apply or to see if the soil test levels are falling too rapidly.

In general if both P and K are needed by your hay or pasture field, add the P and half the K after the first hay harvest or in late-May or early June and then add the second half of the K recommendation in late August or early September. This timing will allow the plant to prepare for the stresses of summer and then for the stresses of winter.

Consider Temporary Annual Forage Crops for Fields to be Planted Later this Year

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If you were one of those producers who were prevented by this past spring’s cold rainy weather to miss out on replanting your pasture or hay field, now is the time to consider a method of preparing the field for late-summer/early-fall (LS/EF) reseeding. The beginning of June’s hot weather (warm soil conditions) is ideal for seeding warm-season annual, weed-suppressing grasses such as hybrid pearl millet, sudangrass, the sorghum-sudangrass hybrids, or even teff. These grasses seeded when soil temperatures are >75° F and adequate soil moisture is present can germinate and establish very rapidly. They have the ability to suppress many weed species and can add organic matter to the soil via the root mass left at the end of the season or the root mass plus final top growth of the season.

Another advantage of the warm-season annual grasses comes from the need for land preparation prior to the permanent LS/EF seeding. This soil preparation provides the producer with the opportunity to check the pasture or hay field’s soil fertility status and to make early adjustments that can be rechecked prior to planting the more expensive perennial grass seed. As an agronomist, I typically recommend checking six months to a year ahead of reseeding a field so that pH adjustment (liming) and nutrient amendments (phosphorus, potassium, or manures) can be applied and will have time to correct any problems in the field. Although the timing here may be tight, it still will allow a producer to recheck the field before establishing the permanent cover.
Another obvious benefit is the increased tonnage the summer annuals offer forage producers. However, care must be taken in selecting not only the annual grass species but the animal species that the forage will feed. Summer annual grasses can have a number of limitations/problems that can be successfully managed by the knowledgeable producer.

Common to all the species (even the cool-season grasses) is the potential for nitrate accumulation and nitrate toxicity during drought or cloudy weather when nitrates are not metabolized rapidly enough by the plant into proteins and amino acids. Nitrates taken up from the soil then accumulate especially in the lower stems and can reach toxic levels and are not reduced during hay harvest. Cyanide toxicity issues exist for sudangrass and the sorghum-sudangrass hybrids but this can be managed with grazing or cutting height. Sorghum species and species such as foxtail millet (*Setaria* spp.) can be harmful to horses (cystitis problems to name one concern). Hybrid pearl millet and pearl millet do not cause these problems and are generally considered safe for horses. Most of the species also have thick stems and large leaves that make hay making a bit more challenging. With careful management, the benefits from weed suppression, forage production, soil tilth, and early soil fertility adjustment outweigh other concerns.

### Check Soybeans for Manganese (Mn) Deficiency

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An interesting fact came up recently about the research retired Purdue University plant pathologist Don Huber has done linking glyphosate and reduced uptake of several nutrients in field crops and possibly leading to increased disease resistance. I found the notation that significantly lower tissue levels of the micronutrients manganese (Mn), zinc (Zn), and iron (Fe) are being taken up by the field crops he studied. In Delaware, we frequently see Mn deficiency symptoms on soybeans especially on sandy soil or where the soil pH is maintained near neutral or above.

Just yesterday driving back from the University of Delaware Research and Education center, I noticed Mn deficiency symptoms showing up in several fields. Manganese deficiency is characterized by dark green veins and light green (mild deficiency) to yellow (moderately severe deficiency) to white (severe deficiency) interveinal leaf tissue. The symptoms often are most severe on the most recently emerged leaves. Manganese deficiency symptoms are similar to the deficiency and toxicity symptoms of some of the other micronutrients.
Yield reductions can be avoided to a large degree by early diagnosis and treatment with foliar application of Mn. Multiple applications of foliar Mn may be needed especially when Mn deficiency is severe. If enough leaf area is present to absorb adequate Mn, a single application higher rate (1 to 2 lb Mn/acre) was shown to be effective by Virginia and North Carolina researchers. Ignoring or not catching the problem until later in the season can not only reduce yield potential but make a foliar application more difficult and possibly more expensive since driving over the soybeans may cause damage on drilled beans. You may need to treat early season symptoms several times since the leaf area available to absorb Mn is limited so always rescout treated fields to be sure Mn deficiency does not reappear after treatment.

Where the symptoms are widespread and moderate to severe, foliar Mn applied at 1 to 2 lbs Mn per acre can boost yields significantly. Since the crop is still in the vegetative stage, mild to moderate symptoms can be alleviated with a 0.5 lb Mn per acre foliar spray. Researchers in Delaware, Virginia, and North Carolina have shown that soybeans are very responsive to foliar Mn especially when applied well before soybeans begin to bloom.
Even if you do not apply foliar Mn, you should be making note of which fields and where in the field symptoms occur so you can monitor these areas in the future. If wheat or barley are to be planted this fall, careful early monitoring will allow you to apply Mn to the small grains before they are severely injured by Mn deficiency. You should also note the areas so you can do soil testing to determine the underlying problem. Check to see if the native Mn concentration in the soil is too low or whether the soil pH is too high since the higher the pH the lower the availability of Mn in the soil. Also, any factor restricting root growth (compaction, drought, etc.) can aggravate Mn deficiency symptoms and should be corrected.

Dr. Joseph Heckman at Rutgers University is writing a series of articles on Mn deficiency in Rutgers Plant and Pest Advisory publication. These publications are available on the web through the Rutgers New Jersey Agricultural Experiment Station. A recent article (Vol. 16, No. 7, page 3) showed research Dr. Heckman conducted comparing manganese sulfate and chelated manganese and this article can be found at the following web address:  

Notice and Upcoming Events

January 17-21, 2011
Delaware Ag Week, Harrington, DE. Contact Cory Whaley at 302-856-7303 or email: whaley@udel.edu


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or

www.mdcrops.umd.edu Click on Newsletter

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