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Agronomy Notes

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Capital Region Extension Agronomy Team

grow BETTER CROPS AND PROFITABILITY

2007

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Aerobic Stability of Silage and Haylage Crops

Across Pennsylvania, predictions have estimated that 2007 will be noted as a significantly short forage crop production year. Livestock and dairy feeders need to ensure that adequate supplies of forage are available for the coming feedout season and adjust feeding programs accordingly.

Next spring may present significant challenges to obtain additional forage supplies. Part of the planning process to ensure adequate supplies will be to ensure that shrink or spoilage of existing forages is minimized. Corn silage and haylage crops are two areas where significant shrink frequently occurs.

The ensiling process involves 2 different biological stages. In the initial stage, the silage or haylage crop contains air (i.e. aerobic) within the silo, bunker or wrapped bale. During this first stage of fermentation, bacteria that depend on oxygen to develop will multiply and consume air within the forage mass. Eventually, in an airtight forage mass, the oxygen is consumed and these organisms die.

After the forage mass has become oxygen free, different fermentation bacteria rapidly begin to grow and multiply. These bacteria, referred to as anaerobic bacteria, are preferred for fermentation because they form lactic and acetic acids that are critical to ensure silage and haylage stability. Eventually, high levels of these acids form and the forage becomes too acidic for the bacteria to survive, causing the crop to become "pickled". As long as the forage remains oxygen free, anaerobic, it will maintain its quality.

Unfortunately, once the stable silage or haylage is exposed to air during storage or feedout, spoilage will occur. Exposure to air may occur due to leaky silos, holes in silage bags or wrapped bales, poorly packed silage, improper covering with too few tires or inadequate overlap of plastic or slow removal during feedout. This spoilage is referred to as aerobic spoilage and losses can be as high as 30 to 40% of the dry matter of the forage. An additional affect of this spoilage is in loss of forage quality.

The primary culprits in aerobic spoilage are yeasts. Yeasts consume lactic acids in the forage and result in silage with a higher pH. At higher pH levels, additional microbes, bacteria and molds rapidly begin to develop, further reducing forage quality. As these undesirable organisms develop, heat will be produced. Aerobically spoiled silage can rapidly reach temperatures as high as 120 – 130°F. Aerobically spoiled forages can have a distinct moldy smell.

Heating and spoilage is undesirable because of losses in nutrients and lowered animal performance. Producers should take time to evaluate their storage systems and structures to minimize the risk of these losses. Check to make sure bunkers are sealed tightly and plastic overlaps are adequately sealed with abundant numbers of tires or gravel bags to ensure no "flapping in the breeze". Review your bunker packing procedures. Size removal rates to feed out a minimum of 6 inches of silage during colder periods and 12 to 15 inches during warmer periods. Covers and ag bags need to be constantly checked for tears and damage from birds and other vermin. Wrapped bales should also be checked for tears and damage.

A penny saved is a penny earned applies to forage storage as well. In times of abundant supplies of feed, especially during short crops, ensuring optimum storage conditions will repay many times over.

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Organic Matter, Soil Carbon Sequestration, No-till and Global Warming

Farmers know that in regards to soil productivity, increases in organic matter (OM) yields many benefits. The dark color (OM) that decomposing manures, cover crops and residues add to the soil increases their fertility and quality.

Soils in the Capital Region and most of PA typically have 2 – 3% OM. Although a small percentage, it is a very important portion of the soil. Even small increases in OM have a large impact on our crop production. This is because ***organic matter is the most important*** component in maintaining healthy and productive soil.

Benefits of soil OM include improved soil structure, resistance to compaction, reduced runoff and erosion, energy and food for soil microbes to thrive on, increased nutrient holding capacity (cation exchange capacity- CEC) and increased water holding capacity. One proven way to manage and increase soil OM is through no-till and conservation farming. Excessive tillage aerates the soil, mineralizing the OM which is then released as carbon dioxide (CO2). This burst of biological activity also results in a flush of nutrients being made available to the crop, but only occurs for a limited time. In no-till production, the release of nutrients is controlled and continues throughout the growing season, thus maintaining, not depleting soil OM.

Carbon, organic matter and CO2 are all inter-related terms. OM is primarily composed of carbon. When soil microbes digest manures and soil OM, they release nutrients to the crop. They also release carbon in the form of CO2. Carbon sequestration is simply the increase in soil OM (soil carbon) through the addition of crop residues, cover crops and manures to our farmland. Through no-till and conservation farming systems, we are removing CO2 from the air, incorporating it into crops and moving it into the soil where it is stored as organic matter.

Benefits of No-till Crop Production

Current research estimates vary but one reputable study by the Oak Ridge National Laboratory (Author: T. O. West; averaging 9 experiments together) found an average increase of approximately 600 lbs. of carbon per acre per year in no-till farming systems. To quote this article: “Agricultural ecosystems have the potential to sequester carbon dioxide from the atmosphere and partially mitigate global climatic change.”

Summary

It appears that not only can no-till crop production enhance our soil health and productivity; if practiced across a wide area it could help address rising CO2 levels and even help slow global warming.

Jeffrey Graybill, CCA
Agronomy - Lancaster County

Planting Begins At Harvest

First things first - you have to get this years crop off before you plant the next one, right? Yes, but getting fields ready for planting begins with the management of crop residue when you harvest, especially in fields where the next crop will be planted using no-till.

Even crop emergence is important and depends on:

- even soil temperature *which begins with even distribution of residue*
- even seed depth *which begins with even distribution of residue*

Soil erosion control is dependent on soil cover…. which begins with even distribution of residue. The amount of residue may be reduced this year in areas affected by dry weather. This may reduce the difficulty in planting through the residue but the importance of even distribution remains as it relates to soil temperatures and soil cover.

Even distribution of crop residue while harvesting is important.

The wider the combine head, the greater likelihood of having a problem with concentration of material. Concentrated crop residues not only cause variation in the soil temperature, they can interfere with seed-to-soil contact and simply make it tougher to plant in the spring. Even if you are tilling, doing a good job of spreading chaff and stalks can minimize the amount of tillage needed to plant the crop next year.

Take the time to make combine adjustments to ensure straw and chaff spreaders or choppers operate properly to distribute residue evenly. Most corn heads do a good job of chewing up the stalks and dropping them back in place. The challenge is greater in the soybean harvest, where essentially the whole plant goes through the combine. Fine material from any crop can end up in a windrow behind the combine because it cannot be thrown as far (due to air drag).

Soybeans are an excellent crop to precede wheat seeding and wheat is an excellent crop to seed after soybeans. Evenly distributed soybean residue is easy to

plant into and wheat serves to provide valuable coverage of the soil. No-till seeding reduces the amount of residue incorporated. It also saves time, which becomes more critical as the planting date gets later into the season.

Planting small grains into corn stalks is more challenging and even residue spreading becomes more critical. Residue distribution should come from the combine, not from chopping or shredding stalks in a subsequent trip when planting with a no-till drill. Chopping stalks tends to cause more problems with drills plugging up than if they were just left alone. If no-till seeding, increase the seeding rate by 10-15%.

John Rowehl, CCA
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Crop Insurance Reminders

Don't miss the deadline to enroll or change your existing policy for fall seeded barley, wheat and APH forage production crop insurance for the 2008 crop year. Protection on these crops is available in most PA counties.

Loss Reporting Reminder

Report damage immediately to your insurance agent. The policy requires reporting damage to your insurance agent 15 days before harvesting begins and again within 15 days after harvesting is completed on each insurance unit (usually FSA Farm Number). **Don't destroy evidence of damage until a loss adjuster evaluates it!**

If you have a CRC policy, remember that it provides revenue protection (loss can be caused by yield and/or price loss). The initial corn price was $4.06/bu. If the October average for CBOT December contract is $3.30/bu., the price difference effectively raises your bushel guarantee by 18.7%.

Good Records are Important

When a loss is anticipated, production is fed before the claim is adjusted or production from two insurance units is mixed, specific detailed record keeping is required. Discuss these topics with your insurance agent to determine the record requirements. If you need a record system, one is available at the webpage: cropins.aers.psu.edu. If you have good crops, good records are also needed to support your APH yields.

Make sure that you know and follow the rules to avoid losing policy benefits. Contact your agent for details.

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Thoughts on Cover Crops

Wheat harvest is well behind us and silage harvest will have begun in earnest as you receive this newsletter. Many producers will have already established new grass and legume seedings at this time. However, it's still not too late to put a little last minute consideration into your species selection.

Legumes such as red & crimson clover, hairy vetch and alfalfa generally do best when seeded in mid-late August. This past year, I no-till seeded strips of crimson clover, hairy vetch, annual ryegrass, oats, diakon radish and rye on September 1st into a harvested corn silage field which had 5,000 gallons of liquid dairy manure applied. The additional fertility stimulated each species to produce exceptional growth. So much in fact that the vetch, clover and ryegrass all smothered and winterkilled. Growers need to be cautious of this possibility. If we experience a warm fall and you are getting over 6" - 8" of growth, consider cutting or grazing as a way to remove some biomass and help prevent winterkill.

Here in the Southeast where we often have an extended growing season, another solution is to delay seeding a week or two for these three species. I feel that we can successfully seed these species in mid to even late September under high fertility conditions.

Keep It Simple

I also planted several combinations of legumes and grasses. In theory, this looked great. The nitrogen and deep tap roots of a legume with the dense fibrous mat of grass should have been an excellent crop to improve the soil and no-till into this spring. What happened? The oats were planted a little thick and out competed the hairy vetch; the ryegrass overtook the crimson clover and even the dikon radish struggled to keep up with the fast growing oats. Our cost per acre was pretty high and we ended up with a single dominant species or none where we had winterkill.

Mixtures can have benefits over and above a single species, but they also add a level of difficulty to our management.

Cover crop species selection and use is an exciting area of farmer interest and industry research. Newer and less familiar species do however, come with some hidden risks, as well as benefits. Let's not forget the basics and learn the proper planting dates, rates and particulars of each species. What are the primary needs for your farm? Fall or spring forage? Cover for erosion control? A no-till planting seedbed? Legumes for N? Grasses to capture manure N?

Jeffrey Graybill, CCA
Agronomy, Lancaster County

Pennsylvania Manure Trader

Launched in August 2007, Pennsylvania Manure Trader (www.manuretrader.org) is a new website devoted entirely to manure.

The site was developed to help Pennsylvania's 55,000 farmers, including those looking for manure to apply to their crops and those needing to remove excess manure from their land.

Pennsylvania Manure Trader is a free and confidential online resource available both to farmers and individuals or businesses seeking to trade, buy, or sell manure for other purposes, such as alternative energy production.

Manure Trader is a partnership between the Pennsylvania State Conservation Commission and the Pennsylvania Small Business Development Centers' Environmental Management Assistance Program.

www.manuretrader.org

Users of Pennsylvania Manure Trader can:

- Have access to a free online resource for listing manure.
- Post listings for wanted and available manure.
- Sign up to receive alerts when a manure listing is posted in a desired category.
- View manure hauler and broker directories.
- And more! Visit Pennsylvania Manure Trader today!

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