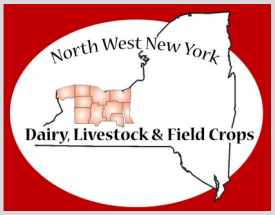
Cornell University
Cooperative Extension
NWNY Dairy, Livestock & Field Crops Team

NORTHWEST NEW YORK DAIRY, LIVESTOCK & FIELD CROPS TEAM

Ag Focus



Working Through the Drought of 2016

Editor's Note: This month's issue will focus on dealing with what Mother Nature has dealt us this growing season. We hope you find these resources helpful.

Optimizing Your Harvest by Reducing Feed Shrink

By: Libby Eiholzer

Many dairy producers across our ten-county region may be short on forages this fall as a result of the drought. In a regular year, silage loss can run 5-10% during harvest, and another 10-50% at the bunk. Consider the following ways to tighten up your management of harvest, storage, and feed-out in order to minimize feed shrink this year.

Harvest. While chopping corn or alfalfa, make sure to get every pound that you can into the truck and into the bunk. Missing a truck with the chopper spout or filling a truck so full that feed blows out during transport are both regular occurrences during corn harvest, but every pound that ends up in the field or on the roadside is a pound that doesn't end up in your cows' bellies. How can you avoid this?

- If you are hauling silage an extended distance, consider the use of a truck tarp to avoid too much loss.
- Make sure that your radios are working well so that the chopper and truck drivers can communicate.
- If you have someone driving truck who is new or out of practice, take a little extra time to let them get up to speed.
- Remind your crew at the beginning of harvest of the importance of getting as much forage as possible into the bunk.

Storage. You have the greatest opportunity to reduce future spoilage while putting up forages in the bunk.

Continued on page 3

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Photo source: Libby Eiholzer

Ag Focus
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Mission Statement

The NWNY Dairy, Livestock & Field Crops team will provide lifelong education to the people of the agricultural community to assist them in achieving their goals. Through education programs & opportunities, the NWNY Team seeks to build producers' capacities to:

- Enhance the profitability of their business
- Practice environmental stewardship
- Enhance employee & family well-being in a safe work environment
- Provide safe, healthful agricultural products
- Provide leadership for enhancing relationships between agricultural sector, neighbors & the general public.

Continued from page 1

- First, remember how dry matter impacts proper packing. Feed that is too dry may not pack well enough to eliminate oxygen, thus leading to poor fermentation. Feed that is too wet can lead to excessive moisture loss due to leaching during fermentation.

- Covering the forage properly is critical, whether it be with 6-8 mil polyethylene plastic or a combination of plastic and an oxygen barrier. Lining bunk walls can help reduce spoilage around walls and corners. Overlapping plastic a good amount when more than one piece is required will also reduce spoilage.

Whether you're storing forages in an ag bag, a drive-over pile, or a traditional bunker silo with walls, proper forage density is key to minimize spoilage.

Photo source: Libby Eiholzer

Feed Out. Once you have a quality feed fermented in your bunk, do everything possible to feed every last pound of it.

- When you don't feed off the face fast enough, exposed feed spoils due to oxygen exposure. Remove at least 6 inches per day from the bunk face.
- Use a defacer to keep the bunk face smooth.
- Keep driveways and feeding surfaces smooth so that the loader and feed truck operators can minimize spillage.

Food for Thought: to cover or not to cover trucks.

By Joan Sinclair Petzen.

The name of the forage harvest game for 2016 in drought stricken area is conservation of every ton of forage you can harvest. During harvest, time is critical and no one wants to afford the time to tarp and un-tarp loads before they dump at the feed storage area. Hydraulic and electric roller tarp systems are used in the construction industry on a frequent basis.

A quick look shows the price of these devices range from around $700 to $1,000. So let's take a quick look at the economics. At the high end of the price range, a farm would need to save 25 tons of as fed feed to break even on the purchase of a tarp system for each truck.

Looking at this another way, haul feed for 1,000 cows, and 55% of their diet comes from forage. In the course of the year one would need to haul over 16,000 tons of as fed forage. If without a tarp, 1/2% of that feed is lost to blow-off between the field and the storage, then, 80 tons of feed is left lying along the roadside somewhere between your field and your feed storage.

At $45 per ton, $3,600 in forage is lost without covering loads.

Information on the amount of feed lost in this manner is not readily available but it gives us something to ponder. If your farm could invest $3,200, cover 4 dump trucks and save 80 tons of feed each season, would it be worth it?

Using an oxygen-barrier layer plus regular bunk plastic seals the silo well and encourages proper fermentation.

Photo source: Libby Eiholzer

Forage Management and Nutrition in the Face of Drought

By: Jerry Bertoldo

Depending on where you are in New York your outlook on what forage inventory might be into 2017 varies from tight to downright frightening. Regardless of the severity of the drought conditions in your area there are some important considerations to keep in mind going into corn harvest time. Many of these are applicable as standard best management practices. Others are particular to drought stressed times.

Forage Inventory

- You need to know where you are and what your usage rates will be. Accurately calculate your present inventory discounting for spoilage. http://fyi.uwex.edu/forage/harvest/#sstorage.
- Have your nutritionist figure the minimum of corn and hay based forage needed to maintain rumen health until spring forage is available to feed.
- Will you able to purchase local or western hay, standing corn, trucked in chopped corn or by-product forage extenders?
- Does a bit of seemingly plentiful chopped straw fit into lower energy diets?
- Do you have or could buy standing soybeans to chop for silage? This is equal in nutrient content to legume silage. Note that certain herbicide use may restrict feeding this in dairy cattle rations. http://www.uwex.edu/ces/forage/pubs/soybean_silage.pdf

Harvest Management

- Regardless of tonnage shortfalls you should strive to maintain quality over yield.
- Be careful of low cutting heights to increase dry matter yield. Besides the regrowth impact on hay crop, there is the issue of high ash content from picked up dirt. This will decrease the nutrient value of the dry matter consumed and increase the risk of clostridium spore inoculation into the silage.
- Dry matter testing prior to corn harvest will be particularly helpful where the lack of an ear takes away the milk line estimator of moisture. Additionally, earless corn will appear drier than it really is. Stalk moisture is drawn down by kernel maturation. Shoot for 32-34% dry matter.
- Nutrient loss and shrink due to poor packing and/or fermentation will be greater with extremes in dry matter content.
- Kernels on poor ear fill plants are still indicative of relative maturity and dry matter. Harvesting at 1/3 to ½ milk line is a thumb rule here.
- Inoculants can improve fermentation characteristics and reduce spoilage at feed out. This is particularly so with high sugar content corn silage with little to no ear where secondary fermentation is common.
- Don't forget about chop length. Using a Penn State shaker box during corn harvest is an excellent way to track chopper setting drift.
- Corn with little or no ear does not need to be processed.
- Segregate severely stressed corn from the less impacted fields if possible. https://www.pioneer.com/home/site/us/silage-zone/library/management-drought-stressed-corn-silage/

Photo source: Nancy Glazier

Purchasing Standing Corn

- Arrange to pay by the ton not the acre. Running at least representative trucks over scales empty and loaded will be necessary.
- A Penn State spreadsheet for pricing standing corn is on our website (http://nwnyteam.cce.cornell.edu) under Fall Feeding Decision Tools.
- Corn grain and silage yields can be estimated by field investigation and some basic math. http://ansci.cals.cornell.edu/sites/ansci.cals.cornell.edu/files/shared/documents/EstmtCornGrainSilgYld.pdf
- For corn with no ears or poorly pollinated ears, a quick estimate of silage yield based on 30" rows is that each foot of corn height (not including the tassels) will yield about 1 ton of dry matter silage per acre based on 30% dry matter at harvest.
- High nitrate content is possible, but not often a practical concern. The highest levels occur when harvest is made within 3-4 days of significant rainfall after a long dry spell. Fermentation of at least three weeks will reduce nitrate levels 30-40%.
- Silage nitrate content of 1000 ppm is the generally accepted break point to avoid oxygen tie up in the blood. Dilution in the diet is the solution here. A healthy rumen will adapt to enable more breakdown of nitrates after a few days of exposure.
- Severely stressed corn silage without ears will have a feeding value of about 66% of normal corn. Even poor earing can raise that to near 90%.
- Analysis of corn silage is important to sort out the wide variations in nutrient values that might be present particularly in upright silos or bags. Wet chemistry is recommended on the most abnormal corn since NIR values are based on "normal" silage. Dry matter, NDF, NDF digestibility, sugar, starch value should be determined.
- With the price of grain corn looking cheap, the temptation will be to use as much corn meal in rations as possible to replace energy usually supplied by forages, especially corn silage. Although it is possible to maintain a healthy, acidosis-free rumen with a 40:60 forage to concentrate diet, that ration - its dry matter, sorting potential, availability and pounds of fermentable carbohydrates - must be within certain biological limits to work.
- Water is often overlooked as a contributor to minerals in the diet. Low water tables and heavy draw on wells can elevate mineral levels in hard water areas beyond normal seasonal fluctuations. Test your water!
- Dr. Larry Chase, Cornell University, has written an excellent article on feeding lower forage rations that will be posted to our website.

Hopefully the old adage "a dry year will scare you to death, a wet one will starve you to death" will be the prevailing rule once again.

Pasture Walk

September 14, 5:30 p.m.-7:30 p.m.

Wooded Acre Farm

4812 Barnard Rd., Hemlock NY

Cost is $15 per person. To register, contact Nancy Anderson at 585.394.4977x427 or nea8@cornell.edu

Register online at https://reg.cce.cornell.edu/Pasture_232

Light refreshments will be provided after the walk.

Disposable boots will also be provided.

Balancing Livestock and Forage to Thrive Past the Drought

By: Joan Sinclair Petzen

If your farm is in one of the areas affected by severe drought, this growing season has been a bit scary to say the least. One of the keys to your livestock business thriving after more "normal" weather patterns have returned is to have your livestock numbers in balance with your feed supply. There are different avenues you can use to achieve short term balance between your herd nutrient requirements and feed inventory.

Take a critical look and evaluate the feeding and production strategies employed at your farm to see if they are still the best way to achieve your income goals. The first step is to determine the nutrient needs of each group of livestock and in total. Next is to estimate the amount of home grown nutrients available toward meeting that need. Most farms in the region already rely on purchasing some nutrients in the form of grain for their livestock and are likely to need to increase those purchases.

If you find you will be short of feed with your present strategy, there are a number of alternatives to consider for bringing your feed and livestock into balance.

- Increase the proportion of grain to forage in the ration. This is most viable when grain prices are low relative to forage and you have plenty of forage in the ration already. With this alternative, it is important to be certain you are meeting the fiber requirements of the cow.
- Purchase forage from a neighbor or outside the region. When purchasing forage, quality is a very important consideration. Know what you are getting from a quality perspective. A nutrient dense feed may come with a hefty price tag but it may be less costly per pound of nutrients than a less expensive feed harvested past its prime. Your network is important now. Keep in touch with others in the industry to learn who might have extra feed they are willing to sell either from their storage or standing in the field. With low grain prices, grain producers might be willing to sell their corn to you for forage rather than combining it.
- Planting winter annual grains for forage and harvesting in the early spring can be employed to boost early spring forage yields. Adequate soil moisture for germination this fall and timely establishment will maximize yields early next spring to help bring your forage inventory back in balance with herd demands.
- For grazers, keeping watch of your pasture and tightening up the grazing interval as you reintroduce cattle to the pastures once grass starts growing again will give more time for recovery and strengthening of the pasture plants going into the coming winter. An application of nitrogen as pastures green up again will help stimulate fall regrowth and lengthen your grazing season once moisture levels increase. If you are forced to graze tight in the fall you will need to plan for slower starting pastures in the spring.
- Consider boarding youngstock with someone who has adequate forage. You might need to look outside the local area to find a heifer grower who has the feed enough to accommodate your heifers.
- Culling the herd heavily may be necessary if inventories are critically low and additional quality forage is not available. To maximize forage savings, make and execute culling decisions sooner rather than later to minimize the number of livestock you need to liquidate to stay within the confines of your forage inventory. Remember, the younger animals are, the less impact culling them will have on conserving forage. You also want to be certain you have replacements in the pipeline to bring the milking string back to full force once your forage inventories are stabilized. Establish criteria for aggressive culling and monitor livestock and forage inventories frequently to be certain you have enough feed to carry your herd through to the next harvest season. Our colleagues across the state have developed a couple of resources to help with culling criteria.

The first is an article by Ron Kuck that discusses management options for different groups of livestock:https://s3.amazonaws.com/assets.cce.cornell.edu/attachments/17085/Dairy_Cattle_Management_Strategies_and_Opportunities_in_a_Drought.pdf?1470667611.

The second is a spreadsheet that illustrates the contribution a cow makes toward fixed costs at different milk prices and production levels: http://nwnyteam.cce.cornell.edu/submission.php?id=589&crumb=forages|2 (called culling guide).

Taking a pro-active approach will help you position your livestock enterprise to thrive after the drought. Managing feed inventories and livestock numbers is a delicate dance but the effort you put into it will pay dividends in added returns for your business.

Upcoming Webinars:

Technology Tuesday Webinar: Water Quality & Water System Design on the Dairy

September 13, 8:30 - 10:00 a.m.

Presented by:

PennState Extension

http://extension.psu.edu/animals/dairy/courses/technology-tuesday-series

Protecting Young Adults in the Agricultural Workforce

September 21

Presented by:

Charlotte Halverson, BSN, COHN-S

Occupational Health Nurse, AgriSafe Network

https://agn.memberclicks.net/live-webinars

Winter Triticale for Extra Spring Forage

By: Mike Stanyard

This hot dry summer has been a rough one for adequate forage production in NWNY. Many farms will be short on feed as hay tonnage is way down and corn fields in many areas are half as tall as normal. I am getting lots of questions about planting additional forages like forage oats, winter grains, and even chopping soybean fields that just might not make it to harvest.

We have been experimenting and working with growing winter triticale as a double crop following corn silage for the past 5 years. Work in the region by Quirine Ketterings and Tom Kilcer have shown that it is a good fit for the dairy and if done properly can provide 2 to 4 tons of dry matter per acre of high quality forage in the spring. Those farms that have stuck with it have been successful and have made it part of their rotation.

Planting Date. As with any small grain, start with high quality seed. We want good germination and successful emergence. **It is recommended to plant 100-125 lbs. per acre**. Over the years and many research trials, we have developed a rule of thumb that winter triticale for forage needs to be planted 10-14 days before the normal wheat planting date. So we are looking at the last week in August through the first week of September as optimum. The earlier planting allows for sufficient accumulation of growing degree days to develop as many tillers as possible this fall. We can still plant into early October in our area but realize that yields will probably be down by 30% compared to early September.

Plant with a drill at 1.25 inches deep. This will be crucial to get a deep root base established to prevent possible winter kill and heaving. This is even more crucial on later planted fields. I have seen fields that were broadcasted on and worked in. These fields had uneven emergence, were patchy and just didn't produce as well. Remember, you are planting a high quality forage crop not a rye cover crop!

Fertility. Most of the needed N-P-K will come from manure worked in following corn silage harvest. It is still best to soil sample to see if additional P and K are needed. If no manure prior to planting, nitrogen will vary depending on planting date. The earliest plantings in August will need 90 lbs. N. This will gradually decrease to 60 lbs. in the first half of September and 30 lbs. after September 20 (Kilcer, personal comm.). An added sulfur source has shown to be beneficial or use ammonium sulfate as your N source. If N can't be worked in (no-till), a protectant should be applied if we remain dry and hot. Again, it is best to soil sample to determine P and K levels. A good "blue book" number would be 40 lbs. each of $P_2 0_5$ and $K_2 0$.

Early planting definitely has its advantages as winter triticale serves a dual purpose of keeping the soil covered over fall and winter and providing quality forage in the spring. Getting the plant well established in the fall with maximum tillers will help it get through the winter and off to a quick start in the spring. An additional 50-80 lbs. of N will be needed at green-up. This can be based on how it looks coming out of the winter. If it looks good, push it with more N.

We will talk more about the stages of triticale, harvest timings, and techniques in the spring. For additional information on winter triticale see the Cornell Nutrient Management SPEAR program Fact Sheet #56, Winter Triticale Forage (http://nmsp.cals.cornell.edu/publications/factsheets/factsheet56.pdf) or the August 2015 Crop Soil News from Tom Kilcer on our webpage (http://nydairyadmin.cce.cornell.edu/uploads/doc_269.pdf).

Photo source: Mike Stanyard

Fall Forages

By: Nancy Glazier

Fall is coming, whether or not you have all your hay crops needed for the winter.

Alfalfa. Looking at fourth cutting? How desperately do you need the forage? Some recent research out of Quebec shows that alfalfa needs at least 500 growing degree days (GDDs base 40°) after the last cutting **OR** less than 200 GDDs prior to a killing frost (25°) for winter survival. Also, forage quality doesn't change as quickly in September, so waiting another week before harvesting will not have much impact on quality. Weigh the risks of taking the cut with the age of the stand in mind. To run some scenarios looking at GDDs, check out http://newa.cornell.edu/. Take a look at some historical data under Weather Data to help make your decisions. Looking at Rochester for the past two years showed 694 GDDs in 2014 and 837 in 2015. Accumulations drop off significantly in October, so weigh the risks with the needs.
Don't forget the importance of good fertility, especially potassium, heading into winter. Adequate potassium is needed in early fall to store energy reserves for winter survival. Some regrowth will help to catch winter snow to hold it for protection and moisture. Fields will need early spring assessment of stand survival.

If some timely rains arrive, an additional 50 lbs. actual nitrogen will help provide a yield boost for grass fields or pastures.

Pastures. Don't jump the gun on getting back to grazing. Some farms are experiencing some regrowth and are patiently waiting, while others are not. Best to give them time to grow to 8-10 inches. Don't overgraze unless you are planning to open things up for a March frost seeding. Fall is the best time to plan for that with either short mowing or close grazing. Another option may be to stockpile for dormant grazing. Even then, it is still critical not to let the animal graze the dormant grasses.

Hay supplies. The USDA's National Drought Mitigation Center states as of August 2nd 17% of the hayland across the country is impacted by drought. According to Progressive Forage website under News, for the first week of August hay supplies generally exceeded demand. This was lower-quality hay with many areas reporting little dairy quality.

Photo source: Nancy Glazier

Supplies are variable across the state. Locally, many hay sellers are taking care of repeat customers now and hanging on to the rest.

Hay is out there, you'll need to find it and secure enough to get you through the winter feeding season. There are many sellers with listings on the internet. One site that has a listing state by state is http://www.hayexchange.com/. The listings appear to be current; descriptions (alfalfa, timothy, etc.) with prices listed. Another option is https://www.haycountry.com/. Prices on these two sites run $200-225/ton. There are also auctions in the region. Finger Lakes Produce Auction has sales every Friday at noon, Finger Lakes Livestock Exchange will hold hay and straw auctions on Wednesdays at 10 am starting in October.

Food for Thought. Keeping the ground covered through the winter is critical, too. Cover crops or winter small grains capture nutrients to hold them for next year's growing season.

Cornell University
Cooperative Extension
Northwest New York Dairy Livestock & Field Crops Team

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BOVINE REPRODUCTION AND A.I. TRAINING COURSE

September 26-27, 2016
Willow Bend Farm
Class taught in English
1159 County Road 7, Shortsville
9:30am—3:30pm

-OR-

September 29-30, 2016
HY-Hope Farms
Class taught in Spanish
5908 Horseshoe Lake Rd. Stafford
9:30am—3:30pm

For more information, contact Libby Eiholzer at 607-793-4847 .

***Not enrolled in the NWNY Team? Contact your local CCE office for more information.**

REGISTER BY SEPTEMBER 19

- $175/person enrolled in NWNY Team
- $225/ person not enrolled*
- Includes lunch on both days & materials
- Classes will be capped at 15 participants per session

Register by calling Zach at 585-786-2251

OR online at

https://reg.cce.cornell.edu/BovineReproduction-2_256

Topics covered will include:

- Bovine Anatomy
- Reproductive Physiology
- Synchronization Protocols
- Heat Detection
- Artificial Insemination Technique
- Proper Thawing of Semen
- Loading A.I. guns
- Practice Breeding Cows

Pricing Corn Silage– Fall 2016

By: John J. Hanchar

Summary

- Analysis suggests corn silage price depends on corn silage quantities, alfalfa hay price, the price received by farmers for milk, and corn grain price.
- Analysis for NY suggests that estimated corn silage price is most sensitive to corn silage quantities, alfalfa hay price and corn grain price.
- Price estimates combined with understanding of relevant supply and demand factors from an individual farm business owner's perspective can aid decision making regarding corn silage price. Given most recently available alfalfa hay and corn grain prices (June 2016, and October, November 2016, respectively), price analysis for NY suggests an estimated corn silage price of about $60 per ton. The Fall 2015 estimate was about $50 per ton.

Photo source: Libby Eiholzer

Determining Corn Silage Price

A farm business owner can examine how much corn silage he/she would be willing to supply to a market at a given price. Analysis of the farm business' cost structure for corn silage production combined with consideration of other factors help to define the supply relationship. A seller can develop a target based upon the above, but actual market conditions provide no guarantee that a buyer will purchase quantities desired at a price that achieves the producer's cost target.

Some farm business owners might approach the problem of determining corn silage price from a value in production, or input demand perspective. Amounts of corn grain and corn stover in a ton of corn silage, relevant prices, and corn silage's place in the milk production process are key variables. A buyer can develop a price target based upon the above, but actual market conditions provide no guarantee that a producer will sell the quantity desired at a price that matches the buyer's willingness to pay.

Although factors in price determination, the two approaches described above in isolation, don't completely determine price and quantity. Supply and demand relationships work simultaneously in markets to determine price and quantity. Empirical price analysis brings supply and demand relationships together to determine price.

Corn Silage Price Analysis

Empirical price analysis suggests that corn silage price is a function of corn silage quantities, alfalfa hay price, the price received by farmers for milk sold, and corn grain price. The ordinary least squares regression model here expresses corn silage price as a linear function of the above variables. The analysis is somewhat rough, elementary. However, readers of the original August 2012 article describing this work and readers of annual update articles note that the analysis and estimates generated help farm business owners price corn silage.

Corn Silage Price Estimates – Fall 2016

The ordinary least squares regression model reported in August 2012, updated here to reflect additional data available to date and changes in other underlying factors, including NYS drought conditions for 2016, produced corn silage price estimates for NY. Below, estimated corn silage price is a function of alfalfa hay price and corn grain price with other factors (corn silage production and milk price) fixed at expected levels. Expected corn silage quantity is set at 7,597,000 tons, 1 standard deviation below the average of 8,214,000 tons for the period 1991 through 2014. During this period, 16 percent of production observations fell below 7,597,000.

- Estimated corn silage price ($/ton) = 11.189 + (0.185 x price of alfalfa hay ($/ton)) + (3.049 x price of corn ($/bushel))

Suppose

- NY alfalfa hay price is $200 per ton, June 2016. (USDA/NASS. Agricultural Prices. Washington, DC: National Agricultural Statistics Service. July 29, 2016.), and
- Corn grain price is $4.00 per bushel (Western NY Energy. "Corn Bids." August 9, 2016. Approximate value based upon reported bids for Fall 2016.)

Using the estimating equation and the above prices for alfalfa hay and corn grain, estimated corn silage price is about $60 per ton. Compare this to last fall's estimate of about $50 per ton. Suppose alfalfa hay price is $200 per ton and expected statewide corn silage production is 7,906,000 tons, 0.5 standard deviations below the mean. Then, estimated corn silage price would be $56 per ton. Buyers and sellers use an estimate as a base, typically, adjusting for quality and/or costs for harvest, hauling and storage based upon the situation, for example, when pricing standing corn for silage.

Corn silage price estimates combined with understanding of relevant supply and demand factors from the individual farm business owner's perspective, including local conditions, for example, effects of drought which can be local in nature, can aid decision making regarding corn silage price.

Winter Wheat Planting

By: Mike Stanyard

What a year for winter wheat production! I have not seen any yield estimates for NY but I can't tell you how many growers told me they had their highest grain averages EVER. Many were close to and over the century mark. Conditions from planting to harvest favored record yields. It's time to start all over again so let's get the planting season off to a good start.

Planting Dates. Ideally, September 15 has been a good starting point for western NY. This has been traditionally based on the timing of the average first frost that would eliminate any Hessian flies. Fly-free dates can vary based on feet above sea level and distance south of Lake Ontario. Starting dates can range as early as September 6th at 1500 ft. in Seneca County to September 17th at 400 ft. in Niagara County.

Variety Selection. Cornell should be releasing the yield results of the 2016 red and white winter wheat trials from across the region around September 1st (Monroe and Livingston counties locally). These results can be viewed at our team web site, http://nwnyteam.cce.cornell.edu/, or send me an email and I'll forward a copy to you. Past years results can be viewed at https://plbrgen.cals.cornell.edu/research-extension/small-grains/cultivar-testing.

Seeding Rates. Seeding rates should increase as the season gets later and should also be adjusted based on soil conditions (See chart). Seeds should be drilled 1-1.5 inches deep for good emergence. See examples below on how to calculate million/pounds of seed per acre

	Seeding Rate (million seeds/acre)				
Soil Condition	Sept. 15	Sept. 25	Oct. 5	Oct. 15	Oct. 25
Good	1.33	1.45	1.57	1.69	1.8
Average	1.45	1.57	1.69	1.8	1.93
Poor	1.57	1.69	1.8	1.93	2.06

Live seed % = Recommended rate / Percentage of live seed = Rate/acre

Winter Wheat Variety Trials

Photo source: Mike Stanyard

Example: 1,350,000 seeds / .90 live seeds = 1.48 million seeds/acre

To figure out how many pounds per acre, use the following formula.
Seeds per acre / # seeds/lb. = lb./acre **Example: 1,450,000 / 13,000 = 111.5 lb./acre**

Starter Fertilizer. I still remember Peter Johnson's presentation at Soybean and Small Grains Congress when he emphasized that if you are not using a starter fertilizer, then you are leaving 8 bushels on the table. He stressed that phosphorus was most important for wheat. He used the example that while soybeans only need 1 pound of P and corn 5 pounds for strong seedling establishment; wheat needs 15 pounds. Follow your soil sample recommendations and remember wheat grows best at a pH around 6.3. I have seen an increase in the number wheat growers putting down a starter down with great end results!

Broadleaf and Grass Weed Management. Winter annual weeds are the most prevalent weed competitor for our winter wheat. Chickweed, purple dead nettle, shepherds purse, corn chamomile and others in the mustard family emerge right along with the wheat crop in the fall and can really pull down yields. Many producers spray with Buctril or Harmony Extra in the fall so they are starting clean in the spring. This is also the best option if you plan to underseed your wheat with clover in the spring. Roughstalk bluegrass and cheat grass can be controlled with Osprey either in the fall or early spring before wheat reaches the jointing stage.

Alternate Energy Systems– Part 4: Geothermal

By: Timothy X. Terry, Harvest NY

Geothermal energy is thermal energy generated and/or stored in the Earth. The adjective *geothermal* originates from the Greek roots *geo* meaning earth, and *thermos* meaning hot.

Geothermal Energy could probably be considered the ugly step-child of the energy industry -- it rarely gets press; has little political clout; few, if any, government subsidies; and remains almost completely unknown to the public. Geothermal energy plants are powered by a free energy source, emit few pollutants, and are usually profitable. Geothermal energy can do everything fossil fuel and nuclear plants can do – supply base load power 24-7-365 - and has the greatest potential for providing the most renewable energy for the world. Proponents have regarded it as green energy's silver bullet, yet geothermal energy supplies only 0.05% of the world's power.

Part of the reason for this is that generating electricity from geothermal sources requires three ingredients: hot rocks, water, and accessibility to the first two. Unfortunately, only 10% of earth has all three. Historically, it has been limited to areas near tectonic plate boundaries. That's why you see these types of power plants in Alaska, California, and Iceland, but not here in the Northeast. We lack a reliable supply of the 700°F superheated steam necessary to efficiently run a generator.

Heating/cooling is cost-effective at many more sites than electricity generation. Moreover, you're not likely to build a 50-megawatt generating station. Where available, natural hot springs, or geysers, may be piped directly into radiators. In hot, dry ground, earth tubes or downhole heat exchangers can collect the heat. However, even here in the Northeast where the ground is colder than room temperature, heat can often be extracted with a geothermal heat pump more cost-effectively and cleanly than by conventional furnaces. These devices draw on much shallower and colder resources than traditional geothermal techniques – 100 feet vs. 3.1 miles deep. They frequently combine functions, including air conditioning, seasonal thermal energy storage, solar energy collection, and electric heating. Heat pumps can be used for space heating essentially anywhere.

The heat pump was invented by Lord Kelvin in 1852. By 1912 Heinrich Zoelly had patented the idea of using it to draw heat from the ground. However, it was not until the late 1940s that the geothermal heat pump was successfully implemented. The technology became popular as a result of the 1973 oil crisis, and has been growing slowly in worldwide acceptance since then. In 1979 the development of polybutylene pipe greatly augmented the heat pump's economic viability.

Geothermal heating and cooling requires no fuel (except for pumps), and is therefore immune to fuel cost fluctuations. In general terms, for every 1 KW of energy expended by the pumps you can get the equivalent of 4 KW of energy out of the earth. However, upfront capital costs can be significant. The necessary earthwork and drilling accounts for the majority of the expense. Residential geothermal heat pumps with a capacity of 10 kilowatt (kW) are routinely installed for around $1,000 – $3,000 per kilowatt.

Basically, a heat pump pulls heat energy from the ground via a closed loop of pipe buried in a trench or bore hole (well). The internal fluid is circulated back to the geothermal unit in the building where it is compressed to a higher temperature and the heat distributed throughout the home. In summer, the process is reversed. Heat is extracted from the home and dispersed to the earth via the same closed loop system.

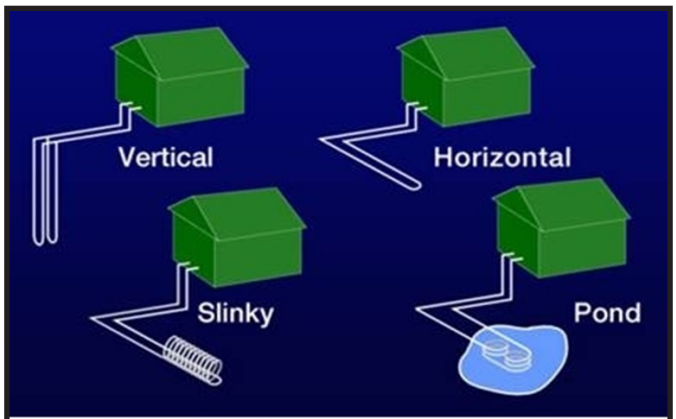

Figure 1 - Types of Closed-Loop Geothermal Systems

Photo source: Minnesota Department of Health

There are four geothermal loop types: vertical, horizontal, lake/pond, and open system.

- Vertical – vertical holes are bored and a closed loop of pipe is threaded down through the hole. Typically used where available land is limited and/or the required size of the loop field would be cost prohibitive. Often used for schools and industrial or office complexes.
- Horizontal – least expensive, used where adequate soil depth is available. Helical loops of pipe (slinky) are laid in a trench 8-10ft. deep. Typical ground loop will use about 400-600ft. of pipe per ton of heating / cooling capacity. Frequently used in new construction.
- Pond/Lake – Obviously requires a body of water large enough to act as a heat exchanger – min. ½ acre in size and 8– 10ft. deep. Pond loop mats are constructed and placed about 1ft. off the bottom of the body of water. Weights (rocks, concrete blocks) are added to keep the system from floating to the surface.
- Open Loop – uses well or surface body water as the heat exchange fluid that circulates directly through the heat pump system. Once it has circulated through the system it is returned via a return loop, recharge well, or surface discharge. Practical only where there is an adequate supply of clean water and all local codes regarding ground water discharge are met. Typical systems will use upwards of 1 million gallons of water per year. That's also 1 million gallons that has to be safely returned to the aquifer or the environment. These systems also require water testing and a strict adherence to a maintenance schedule to keep the water from fouling the system.

Industry estimates of 40% - 60% cost savings over high efficiency natural gas systems are common, and even up to twice that for older (pre-1980) heating and cooling systems.

A 30% federal tax credit may be available for new installations, but it must be Energy Star® rated and include a hot water generator for domestic hot water supplementation. In other words that's 30% of the project costs, or, put another way, if the project costs $10,000 your savings would be $3,000.

Here are some additional resources for your viewing pleasure:

https://www.youtube.com/watch?v=mCRDf7QxjDk

https://www.youtube.com/watch?v=1C_4fanmxns

https://www.youtube.com/watch?v=uVDBRQvBVso

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2004 KENWORTH C500; 475 HP CAT C15 Diesel; 18-Spd.; Engine Brake; 4.88 Ratio; 24.5 Tires; Alum. Wheels; 340" WB; Tandem Axle; 20,000# F/A; 46,000# R/A; Double Frame; Heavy Duty Truck w/26½" Frame Behind Cab; 216,455 Miles; Stk. #5151CC - **$39,500**

2004 MACK RD888SX; 350 HP Reman Mack Diesel; 8LL Trans.; 6.73 Ratio; 12.00 x 24 Tires; All Steel Wheels; 390" WB; Tandem Axle; 23,000# F/A; 58,000# R/A; Clean, Texas Rig Up Truck w/Double Frame; Tulsa 80F and 64; 135,213 Miles; Stk. #5098 - **$45,900**

2005 Peterbilt 357; 370 HP CAT C11 Diesel; Auto. O/D Trans.; 5.38 Ratio; 22.5 Tires; Alum./Steel Wheels; 216" WB; Tandem Axle; 20,000# F/A; 46,000# R/A; 66,000# GVW; 85,200 Miles; Stk. #5075 - **$55,000**

2001 INTERNATIONAL 2674; 435 HP Cummins N14 Diesel; 8LL Trans.; Air Ride Susp.; 24.5 Tires; All Steel Wheels; 242" WB; Tandem Axle; 20,000# F/A; 46,000# R/A; 152,515 Miles; Stk. #5042cc - **$35,500**

2010 PETERBILT 367; 485 HP Cummins ISX Diesel; 10-Spd. Engine Brake; Air Trac Susp.; 24.5 Tires; All Steel Wheels; 202" WB; Tandem Axle; 13,200# F/A; 46,000# R/A; Very Clean Daycab Tractor w/Air Slide 5th Wheel; Steer Tires 99%, Drives 90%; 369,622 Miles; Stk. #4990/4991 - **$43,900**

1996 PETERBILT 357; 300 HP CAT 3306 Diesel; 8LL Trans.; 12.00 x 22.5 Tires; All Steel Wheels; 216" WB; Tandem Axle; 22,000# F/A; 46,000# R/A; Very Clean 6x6 Cab & Chassis w/17' Frame Behind Cab; 132" CT; 3/4 Locking Rears; Stk. #5091 - **$36,000**

2001 KENWORTH T800; 430 HP CAT C15 Diesel; Auto. Trans., Engine Brake; 4.11 Ratio; 22.5 Tires; All Steel Wheels; 246" WB; Tandem Axle; 12,000# F/A; 44,000# R/A; Very Clean, Low Mile Southern Truck w/21.5' Frame Behind Cab; 160,558 Miles; Stk. #4918 - **$36,900**

2006 KENWORTH T800; 430 H CAT C13 Diesel; Engine Brake; 22.5 Tires; Alum. Wheels; 238" WB; Tandem Axle; Pneumatic Tank Type; 3,100 Gal Capacity; Steel Composition; 4.30 Ratio; 20,000# F/A; 46,000# Full Locking R/A; Water Tank Truck w/Gardner Denver 3x5 Triplex Pump; Dual Air Cleaners & Exhaust; Good Rubber; 236,724 Miles; Stk. #4943 - **$44,900**

2005 MACK GRANITE CV713; 460 HP Mack AC460 Diesel; 18-Spd.; Engine Brake; 24.5 Tires; Alum. Wheels; 237" WB; Tandem Axle; 4,200 Capacity Steel Body; 18,000# F/A; 46,000# R/A; Clean, Low Mile Vac Truck; 93,746 Miles; Stk. #5047 - **$53,900**

2004 KENWORTH T800; 335 HP CAT C10 Diesel; 10-Spd.; Engine Brake; Hendrickson Susp., 22' Length X 102" Width; 5.29 Ratio; 22.5 Tires; All Steel Wheels; 240" WB; Tandem Axle; 20,000# F/A; 44,000# Full Locking R/A; Low Mile, Double Frame Flatbed Truck w/PTO; Will Separate Flatbed From Chassis; 20' Frame Behind Cab; 160" CT; 75% Rubber; 110,826 Miles; Stk. #4952 - **$44,500**

(2) 2009 WESTERN STAR 6900XD; 665 HP Dtroit 14L Diesel; 8LL Trans.; Engine Brake; 25' Steel Body; 11.23 Ratio; 16.00R25 Tires; All Steel Wheels; Tandem Axle; 26,800# F/A; 100,800# R/A; 58,000 Miles; Stk. #5092/5093 - **$94,500**

1999 VOLVO WG64; 350 HP Cummins M11 Diesel; 8LL Trans.; 4.33 Ratio; 22.5 Tires; Alum./Steel Wheels; 254" WB; Tri-Axle; 18,740# F/A; 46,000# Full Locking Rears; 35 ft.; Double Frame Truck w/Hiab 235K Crane; 357,502 Miles; Stk. #5055 - **$24,900**

2006 WESTERN STAR 4900FA; 515 HP Detroit 14L Diesel; 8LL Trans.; Engine Brake; 12.00 x 24 Tires; Alum./Steel Wheels; 404" WB; Tandem Axle; 20,000# F/A; 46,000# Full Locking Rears; Very Heavy, Double Frame Truck; Winch & Flatbed Can Be Removed; 30+ ft. Frame Behind Cab; 315" CT; Good Rubber; Low 143,295 Miles; Stk. #5097 - **$37,900**

2001 INTERNATIONAL 2674; 435 HP Cummins N14 Celect Diesel; 10-Spd.; Engine Brake; 25' Length x 96" Width; 22.5 Tires; Alum./Steel Wheels; 278" WB; Tandem Axle; 20,000# F/A; 46,000# Full Locking R/A; Double Frame Flatbed Truck; Will Separate Flatbed From Chassis; 25' Frame Behind Cab; 206" CT; 199,970 Miles; Stk. #5094 - **$29,500**

QTY. (3) 2005 PETERBILT 357; 305 HP CAT C11 Diesel; Automatic; Haulmaax Susp.; 216" WB; 22.5 Tires; Alum. Wheels; Tandem Axle; 22,000# F/A; 46,000# R/A; 133,852 Miles; Good Running, Low Mile Truck w/McNeilus 10.5 Cu. Yd. Mixer; We Will Separate Mixer From Chassis; 17' Frame Behind Cab; 140" CT; Stk. #4893-4894 - **$56,500**

1999 MACK RB688S; 400 HP Mack E7 Diesel; 8LL Trans.; Engine Brake; Rubber Block Susp.; 19' Length; 22.5 Tires; Spoke Wheels; 248" WB; Tri-Axle; 20,000# F/A; 46,000# R/A; 501,176 Miles; Stk. #4760 - **$24,900**

2003 PETERBILT 379; 525 HP CAT C15 Diesel; 8LL Trans.; Engine Brake; 4.11 Ratio; 24.5 Tires; Alum./Steel Wheels; 302" WB; Tandem Axle; 18,740# F/A; 46,000# R/A; Double Frame; 294,095 Miles; Stk. #4947 - **$47,900**

2005 INTERNATIONAL 7500; 330 HP Int'l DT570BB Diesel; 10-Spd.; 13' Steel Body; 22.5 Tires; All Steel Wheels; 178" WB; Tandem Axle; 12,350# F/A; 40,000# R/A; Clean Dump Truck w/Hitch & Trailer Hookups; 130,558 Miles; Stk. #5099 - **$43,900**

2004 FREIGHTLINER BUSINESS CLASS M2 112; 435 HP Mercedes OM460 Diesel; 13-Spd.; Engine Brake; 16' Steel Body; 24.5 Tires; Alum. Wheels; 234" WB; Tandem Axle; 20,000# F/A; 46,000# R/A; Clean, Low Mile Dump Truck; 209,264 Miles; Stk. #5141 - **$34,900**

2005 INTERNATIONAL 5900i; 475 HP Cummins ISX Diesel; 18-Spd.; Engine Brake; 24.5 Tires; Alum./Steel Wheels; 365" WB; Tandem Axle; 40,000# F/A; 46,000# R/A; Double Frame; Twin Steer Cab & Chassis (Deck To Be Removed); 317,179 Miles; Stk. #5109c - **$52,500**

2006 PETERBILT 357; 475 HP CAT C15 Diesel; 18-Spd.; Engine Brake; 24.5 Tires; Alum./Steel Wheels; 231" WB; Tandem Axle; 14,350# F/A; 46,000# R/A; Very Clean, Double Frame Truck; Good Rubber; 176" Frame Behind Cab; 535,919 Miles; Stk. #4803 - **$56,900**

2007 MACK VISION CX613; 66" Mid Roof Sleeper; 350 HP Mack Diesel; 13-Spd.; 22.5 Tires; Alum. Wheels; 222" WB; Tandem Axle; 12,000# F/A; 40,000# R/A; **EXPORT PRICING SHOWN!!!** Very Good Running Sleeper Truck w/Air Slide 5th Wheel; Stk. #5031 - **$16,900**

2000 VOLVO WX64; 275 HP Volvo VE Diesel; Allison Auto. Trans.; 5.86 Ratio; 22.5 Tires; All Steel Wheels; Tandem Axle; 18,000# F/A; 40,000# R/A; Low Mile Garbage Truck w/Pak-Mor 24 Cu. Yd. Front Load Packer; 33,513 Miles; Stk. #5041 - **$15,900**

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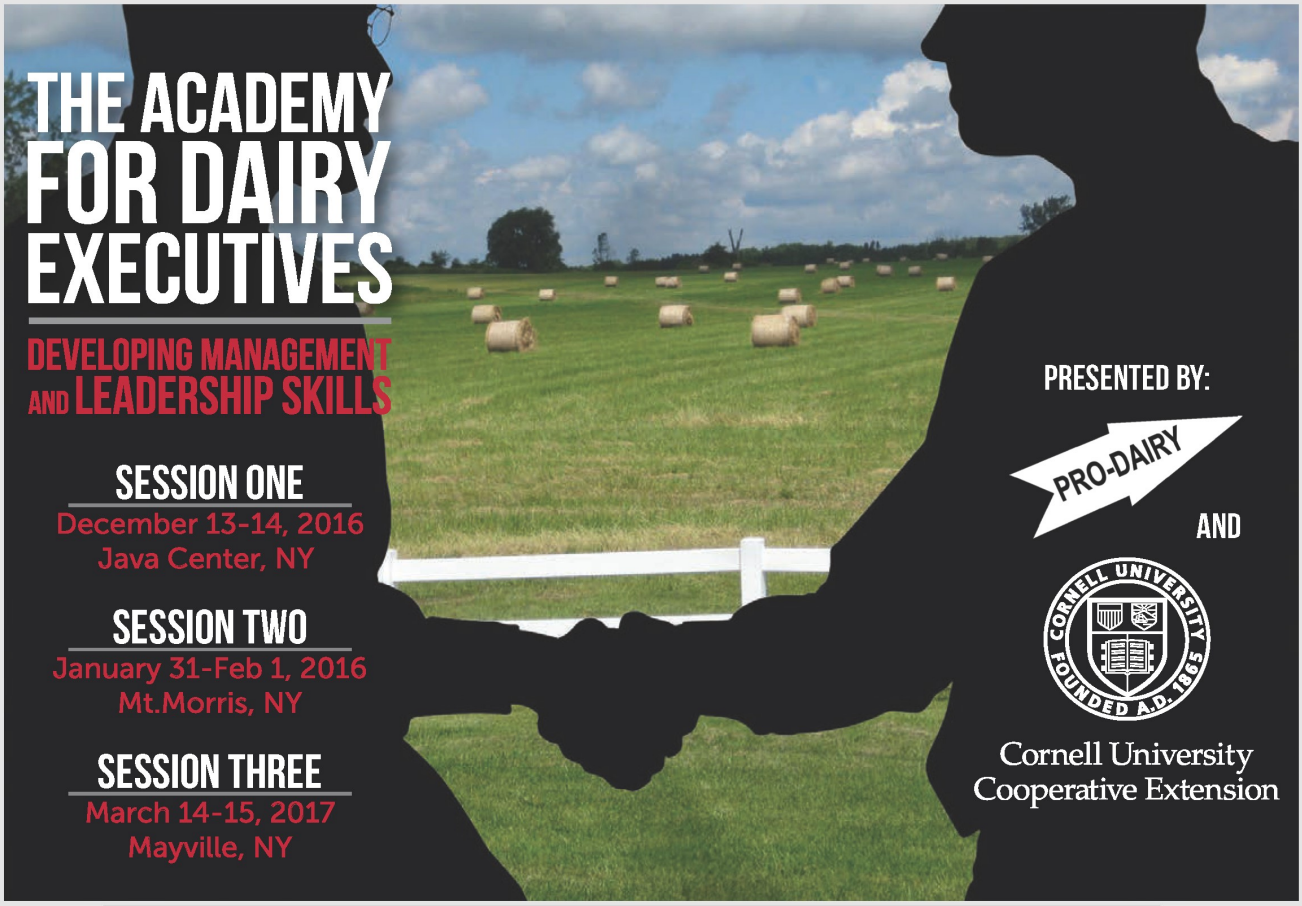

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MORE INFO OR TO APPLY: Contact Joan Petzen via email jsp10@cornell.edu or phone 585-786-2251 x122 or Libby Eiholzer via email geg24@cornell.edu or phone 607-793-4847

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14 ***Pasture Walk***, 5:30 p.m.-7:30 p.m., Wooded Acre Farm, 4812 Barnard Rd., Hemlock, NY. Contact Nancy Anderson, 585.394.4977x427 or nea8@cornell.edu. **See p. 5**

17 ***Beef Quality Assurance at Runnings***, 3191 Eastern Blvd, Canandaigua, NY. Contact Carol Gillis, NY Beef Council, 315.339.6922 or cgillis@nybeef.org

17 ***Livingston County Farm Bureau FARM FEST*** 10:00 a.m. - 3:00 p.m., Swyers Dairy Farm on Kenney Road in Dansville, NY. Contact Meghan Rodwell to volunteer at Meghan.rodwell@farmcrediteast.com or 585.703.2149

26- 27 ***Bovine Reproduction and Artificial Insemination Course***– 9:30 a.m.-3:30 p.m., Willow Bend Farm, 1159 Country Road, Shortsville, NY (English). **See p. 10**

29-30 ***Bovine Reproduction and Artificial Insemination Course***– 9:30 a.m.-3:30 p.m.,Hy-Hope Farms, 5908 Horseshoe Lake Road, Stafford, NY (Spanish). **See p. 10**

OCTOBER 2016

15 ***Academy for Dairy Executives Application Deadline.*** **See p. 19**