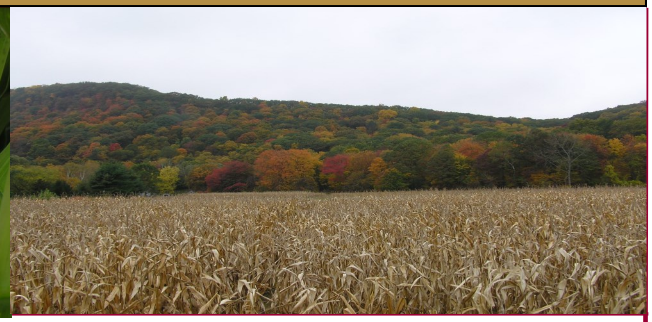
UMass Extension Crops, Dairy, Livestock & Equine Newsletter

WINTER 2017

VOL. 19:1



Inside this issue:

Editor,

Masoud Hashemi

Upcoming Events:

SARE Antibiotic Stewardship Initiative Workshop

Health Care Practices for our Food Animals

Thursday , December 14th 9:30 am-1pm

UConn Extension Tolland Office, 24 Hyde Avenue, Vernon, CT

Contact Jean King jean.king@uconn.edu

or Michael.Keilty michael.keilty@uconn.edu for more information.

www.meatsystems.uconn.edu

Save the Date!

Making the Most Out of Pasture and Hayfields

A Multistate Collaborative Event!

February 23, 2017 9:30am to 3:30pm

Topics Include:

Managing Alfalfa/Grass Mixtures for High Quality

Extending Grazing Opportunity Through Summer Annuals

Take Your Pasture and Hayfield to the Next Level

Strategies for Implementing Double Cropping of Winter Grains

Location: Massachusetts Fish and Wildlife Headquarters,

1 Rabbit Hill Road, Westborough, MA 01581

Lunch Provided, More Information to Follow

Announcements:

Dear Massachusetts Farmer,

The U.S. Department of Agriculture's National Agricultural Statistics Service (NASS) is preparing the mail list for the 2017 Census of Agriculture. The Census of Agriculture is the leading source of facts and figures about American agriculture. Conducted every five years, the Census provides a detailed picture of U.S. farms and ranches and the people who operate them. It is the only source of uniform, comprehensive agricultural data for every state and county in the United States.

I am asking for your help to make the 2017 Census of Agriculture as accurate as possible. A major challenge is having a list of farmers that is as complete as possible, especially with so many new farmers. If you have never received a Census of Agriculture or survey questionnaire from NASS then we may not have you on our farm list. Please take a couple minutes and provide NASS your contact information athttps://www.agcounts.usda.gov/cgi-bin/counts/.

Even if you do not think of yourself as a farmer or rancher, your operation is a farm if it meets the Census of Agriculture definition – an operation that sold or normally would have sold $1,000 or more of agricultural products in a year. If you own or rent agricultural land, grow vegetables, grow horticultural or floricultural products, have fruit or nut trees, cattle, horses, poultry, hogs, bees, aquaculture products, or consider yourself a farmer or rancher, we need to hear from you.

All individual information provided to NASS is confidential and only used for statistical purposes. In accordance with the Confidential Information Protection provisions of Title V, Subtitle A, Public Law 107-347 and other applicable Federal laws, your responses will be kept confidential and will not be disclosed in identifiable form to anyone other than employees or agents. By law, every employee and agent has taken an oath and is subject to a jail term, a fine, or both if he or she willfully discloses ANY identifiable information about you or your operation.

If you have previously received a Census of Agriculture or survey questionnaire from NASS then you will be receiving you 2017 Census of Agriculture questionnaire in late December 2017 or January 2018. Your cooperation is appreciated.

Sincerely,

Gary R. Keough

Gary R. Keough, State Statistician

U.S. Department of Agriculture | National Agricultural Statistics Service

Field Operations | New England Field Office

53 Pleasant St. Room 3450

Concord, NH 03301

USDA

To: Dairy/Livestock/Poultry Farmers of MA and CT

From: USDA Wildlife Services MA, CT, RI Office

Subject: 2017 Starling Reduction Program

Once again this fall into winter, USDA APHIS Wildlife Services will be conducting our European starling reduction program using the avicide DRC-1339 at dairy and poultry operations throughout Massachusetts and Connecticut. Annually our office receives numerous requests for assistance controlling starlings and we are anticipating a very busy season because of the mild temperatures we experienced last winter.

We will begin this work in November continuing through March. A good 'pre-bait' acceptance is essential for successful starling control, and works best during very cold temperatures with a snow cover which restricts their availability to find food. Birds must be trained to feed on high fat content pellets which are supplied by the USDA. The pre-bait pellets are applied daily at designated feeding areas away from livestock. Once the starlings are feeding well on the pre-bait pellets, the toxicant DRC-1339 will be applied on the pellet feed in the same baiting areas.

Our Wildlife Service office is under the U.S. Department of Agriculture; however, we are not federally funded to perform control activities. As a result, we are required to obtain outside funding for all direct control projects. This is accomplished through the use of a Cooperative Service Agreement, where the cooperator agrees to compensate our office for the costs of personnel, travel, equipment and supplies. Our office is a non-profit federal agency.

If you are interested in our European starling reduction program, we ask that you call our office toll-free at (866) 487-3297 or my cell (413) 335-1554. We will schedule a site visit to discuss your particular starling control needs. On a later visit, we will apply the toxicant. All activities will be conducted in accordance with the National Environmental Policy Act and all state and local regulations.

Thank You.

Colby Cousineau, Wildlife Specialist

MA/CT/RI Wildlife Services

463 West Street

Amherst, MA 01002

Phone: (413) 253-2403

Fax: (413) 253-7577

Toll Free: (866) 487-3297

Colby.E.Cousineau@aphis.usda.gov

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APHIS is an agency of USDA's Marketing and Regulatory Programs

Something New is Brewing on 5th generation Family Farm

Farm Family breathes new life into an old barn

-Matt Zarif

A small craft brewery has opened the doors of a historic barn on the scenic, 5th generation Carter & Stevens Farm in Barre. The brewery will focus on brewing american and rustic farmhouse ales, highlighting locally sourced and estate grown ingredients. The farm is growing several acres of barley and has planted a hopyard that can be viewed from the barn. Other homegrown ingredients like maple syrup, honey, herbs, and pumpkins, may find their way into specialty brews.

Carter & Stevens Farm is a 5th generation family farm on about 1000 acres of fields, pasture, and forest in the rural central Massachusetts town of Barre. Originally started as a dairy farm in 1938, the farm currently runs a diverse operation that helps to support five families spanning four generations. Everyone helps out, from the great grandparents in their eighties to their seven great grandchildren under eight years old. "At 82, Papa (Dan Stevens) has more energy than most people I know in their 20's" says co-founder Sean DuBois. It's a common sight to see the kids riding along in a tractor, barefoot in the field helping to plant vegetables, or hauling bottles of raw milk.

Working on the farm isn't so much a job as a lifestyle, long hours, seven days a week. "It's not a job, it's a way of life" Says Farmer Phil Stevens "You're at the mercy of lots of things you can't control... weather, fuel prices, feed costs, the price of milk, equipment breakdowns, cows getting loose. And the cows always seem to get out around dinner time!" While herd of 200 dairy cows may sound big, its tough to compete with the nationwide trend toward large, industrialized factory farms in the Midwest and Canada with thousands or even tens of thousands of cows. "To put things in perspective," says Stevens, "we had about 5,000 dairy farms in our state in the 1950's. Today we're one of just 147 left. We've lost something like 40 farms a year since the 1970's."

One way the farm has remained sustainable is by always looking for ways to branch out and diversify. In addition to dairy, the farm produces hay, firewood, compost, sweet corn, vegetables, pumpkins, maple syrup, and grass fed beef. They are able to save on fuel costs lessen their carbon footprint by producing the majority of their own electricity, heat, and hot water, with a wind turbine on the hill, solar panels on the barn, and a boiler that runs on sustainably harvested firewood.

In 2002, farmer Molly Stevens DuBois started a small roadside vegetable cart with a coffee can where people could buy vegetables on the honor system. That's grown over the years, and now it is a seasonal farm store and deli that stocks the farm's own produce, raw milk, ice cream, local wine, beer, cider, cheese, and natural foods. On summer weekends in July and August, the farm has an outdoor "field to flame" BBQ restaurant with smoked barbecue that features their own veggies and grass fed burgers, all cooked on a wood fire. There is a playground, petting zoo, and live music. It has been steadily growing in popularity each year, and is becoming a local landmark and agritourism destination.

Stone Cow Brewery continued:

In 2006, a devastating barn fire leveled the historic hay barn next to the farm store. as the smoke cleared and the ashes settled it left a large, empty footprint of land. As Carter & Stevens Farm was dealing with the aftermath of the blaze, the neighboring Neylon family offered to donate their antique post and beam barn to replace the one that burned. The Neylon barn was located about a quarter mile down the road. Built in the early 1800's, the beautiful New England barn features a hand-hewn, old growth, heavy timber frame constructed of posts made of hardwood American Chestnut, a once ubiquitous species wiped out in the early twentieth century by a blight. The ridgepole spans 60 feet, hewn from old growth timber that would have started growing in the early 1600's, when native americans still inhabited the area. The barn was in need of significant repair and in danger of future collapse.

For over 5 years the Carter & Stevens Farm family began the monumental task of moving the Neylon barn, in between farming and fieldwork. Each of the over 120 post and beam timbers was tagged, moved, and placed back into its precise location. New siding was milled from pines growing on the hundreds of acres of forest the farm preserves. The barn and an addition house the Stone Cow Brewery and a kitchen to expand the fieldstone BBQ restaurant.

The obvious reference for the name 'Stone Cow Brewery' is the 5 ton stone cow statue in front of the farm store built by farmer Phil and neighbor Jason Benoit, who boast that it is the "biggest natural stone cow in the world!" Upon looking into the history of the barn, the family discovered a new level of meaning in this name. "It turns out the original owners of the barn in the early 1800's were the Stone family, who milked cows between those old chestnut beams." says brewery co-founder Matt Zarif. "So we've got a name that really honors the history and links the past with the present and future of the farm. We hope to keep that history alive, keep the tradition of New England farmers' yankee ingenuity, incredible work ethic, and the do anything attitude that I've witnessed in the Stevens family, which I'm truly humbled to be a part of. There aren't too many people I know who would look at a 200 year old, 3600 square ft barn and think, 'sure, we can move that thing!' In the 1800's it took would have taken a barn raising, the whole community coming together, to put up that barn, and that spirit could be felt throughout this project, with everyone pitching in and working together to overcome obstacles that, at times, seemed insurmountable. We'd like to think that the original builder's from the 1800's would be happy to see the barn saved-- and to drink a farm brewed beer with us."

Contact:

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mattz@stonecow.com
413-552-6048

Growing Hops in New England

-Kelly Kraemer

At Goats Peak Farm in Easthampton, Massachusetts, a family business is growing hops. At 23 years old and a fifth -generation farmer, Luke Lepine is ready for the task. As a recent graduate from the UMass Stockbridge School of Agriculture, Luke was working with his father on a construction project at Fort Hill Brewery in 2012. While helping build the brewery, Luke determined there was both a need and a market for local hops in the area. With well-drained, Hadley soil, the family farm presented a perfect location for production. Starting as a dairy turned tobacco farm 100 years ago, the Lepine family has now built a successful hops business, selling and trading their pelletized hops to local breweries.

The Lepine's started in 2015 with 600 Cascade variety plants on 1 acre, producing 2lbs. of hops per plant. Due to the drought in 2016, each plant only produced 1 lb. However, growing hops is a major investment of both time and money. From the equipment and infrastructure needed for production to the intensive labor and hours spent, growing hops, especially in New England, is no easy feat.

Growth and trellising: Hops are a perennial, vining plant. Vines are produced annually from the overwintering crown (root stock) of the plant. To trellis the vines, a 20ft. pole is pounded 4-5ft. into the ground, leaving an optimal 15ft. of vertical space for climbing growth. The vines emerge in late April are are strung up annually, ceasing lateral growth around the summer solstice in mid-June. From there the vines begin to form cones in late July to early August, and they are harvested the end of August. Plants are then cut down to a height of just a few inches as they enter winter dormancy.

Water: Hops require substantial amounts of water - approximately 3 gallons per week per plant during the growing season. Drip irrigation is the ideal watering method, however materials can be costly. The Lepine's currently do not have any irrigation in the hopyard. They have been hand watering the hops by filling up a 50 gallon drum with a hose connection on the bottom, and watering them individually.

Pests and disease: Hops are susceptible to a variety of pests including aphids and potato leaf hoppers, as well as pathogens downy and powdery mildew.

Equipment: Required equipment includes a tractor, harvester (Bine3060), oast (dryer), and pelletizer. Oasts provide the "just right" conditions to dry fresh, wet hops, while preserving the hops' flavors and aromas; they can also be a significant expense. Fortunately, the Lepine's were able to build their own oast.

Fertilizer: Nitrogen fertilizer is a primary expense in hop production. The University of Vermont reports nitrogen requirements of up to 100-150 lbs/A; the Lepine's use horse and cow manure to supplement this need.

Local hops production, though there is a market, is a difficult but growing venture. In western Massachusetts alone, there are 5 established hops farms within 30 minutes of UMass. With a strong micro-brewery market in the western Mass area, the market for hops is strong. However, Luke says they are not really in this business for the money, but for quality, local beer.

Growing Hops In New England continued:

You can find the Goats Peak Farm hops in beers at the Tributary Brewery in Kittery, Maine, at the Portsmouth Brewery, in the Hoppy Valley brew from Abandoned Brewery in Easthampton, and in the Harvest Beer at Fort Hill brewery in Easthampton. When asked what his favorite beer was, Luke responded with a great answer for any hop-head, “Sierra Nevada Torpedo”.

Managing Phosphorus in Organic Residuals Applied to Soils: Compost, Biosolids, Manures, and Others

By: Sandra Thomas, UMass

November 7, 2016

Responding to the increased need for education on the science behind soil phosphorus, how phosphorus works with organic residuals applied to soils, and the protection of precious water resources, UMass Amherst Extension Agriculture and Commercial Horticulture Program organized and presented a full-day symposium in Marlborough on November 2. Over 140 regulatory officials, scientists, agricultural producers, turf and grounds management professionals, industry experts, and organic residuals distributors participated. Speakers from UMass Amherst, Cornell University, the Pennsylvania State University, University of Maine, University of Delaware, University of Connecticut and industry leaders addressed how to develop a balanced system for the use of organics, with their multiple and significant benefits, without adding to the potential for negative environmental impacts caused by the presence of excessive phosphorus. Organic residuals include composts, biosolids, and manures, as well as food and manures digestates.
The symposium not only brought to bear the most current scientific knowledge on the topic, but also provided a unique opportunity for dialogue amongst all present on the presence, forms, dynamics, transport, and fate of organic sources of P applied to soils. Through participatory round table, panel and open forum discussions, attendees tackled several issues including: How does the use of organic residuals impact agricultural and turf soils, soil P and the movement of P from soil systems? What analyses, interpretation and guidelines are needed? What are the most environmentally-responsible and practical Best Management Practices for using these materials? Is research needed to address questions for which the answers are not clear?
Attendees commented on their new appreciation for the complexity of the issues and the thorough manner in which they were addressed, expressed how valuable the discussions were to their businesses, operations and communities, and called for UMass Extension to continue to provide education and research in this area.

Sponsors of this event: Agresource, Inc., PJC Organic, Osborne Organics, Casella Organics, Cabot Creamery, the North East Biosolids and Residuals Association, Northern Tilth, and SARE.

Phosphorus Management

Over the last few years, some growers have been wondering: *How did my soil phosphorus levels get to be so high and what can I do about it to keep from being a source of phosphorus pollution?* UMass Extension hosted a symposium last month on '***Managing Phosphorus in Organic Residuals Applied to Soils***' with experts and professionals from all over the region and we now have a better understanding about how to tackle that question. We learned that Phosphorus demand and supply are unevenly distributed in the US and within our region with New England being a net importer of P in the form of fertilizer and feed (human and animal), therefore we can improve P management by using local sources. Highlights from the symposium about soil phosphorus dynamics, soil testing and interpretation, and P mitigation strategies are included here to help growers take some practical steps toward improved P management.

Soil phosphorus dynamics

Fertilizer phosphorous comes mostly from fossilized bones and is rapidly fixed once applied to soil. Organic forms of phosphorus applied—including manure, compost, biosolids, or cover crops—become available more slowly through the growing season, depending on microbial activity which is regulated by temperature, moisture, and soil fertility. For example, in cold soils below 50°F, the mineralization of P from organic sources by microbes is slowed down, and there is often a crop response to additions of P containing more rapidly available starter P fertilizer. From either source, phosphorus is highly soluble and erodible if not incorporated into the soil where it will quickly—within a few hours—bind with iron, aluminum, calcium or magnesium (depending on soil pH) and consequently become very slowly soluble for plant uptake (Fig 1). Incorporated P can still contribute to pollution when soil particles containing P erode with wind or water. In most soils, there is plenty of Fe, Al, Ca and Mn to bind P so surface runoff from unincorporated fertilizer or organic matter is the largest source of P pollution. An actively growing root system is one of the best ways to cycle P, utilize it for crop growth, and reduce potential for erosion. The concentration of soluble P needed for growth of agronomic crops is about 0.2 ppm, while a phosphorus concentration ten times lower of 0.02 ppm is all it takes for aquatic plants to grow and cause eutrophication in aquatic systems. This is why phosphorus can so quickly cause water pollution.

Phosphorus testing and interpretation

A good practice is to take soil samples at the same time each year (usually fall) to monitor soil test P levels over time and find out if they are increasing, which would indicate that more P is being applied than is being removed by crops. Modified Morgan extractions are still considered the most accurate soil analysis method for New England soils because it has been widely used to conduct nutrient management studies and correlate crop yield to fertility amendments in our region. Until 2012, the UMass soil lab did not consider soil test P levels to be above optimum until the soils exceeded 40ppm P. However, with recent research showing that P was leachable in certain soil settings at 40 ppm and data showing that crops do not require >14ppm P to achieve maximum yields, soil test interpretations were changed to label soils with >14ppm P to be "above optimum". Therefore, you may Different soil test solutions extract different amounts of P from the soil and we don't have as good an understanding of what these values mean for crop yield responses in New England soils. University soil testing labs in VT, MA and CT give P fertilizer recommendations based on extracted P and Al to account for buffering capacity. When testing organic residuals (e.g. compost or biosolids), water extractable P (WEP) is a useful additional analysis to Total P (TP) for determining risk of runoff. Water extractable P represents the P that is available at the time of application, while Total P represents P that will become available during the growing season through mineralization.

The UMass soil lab no longer offers compost analysis but here are labs that offer testing services discussed in this article:

University of Massachusetts Soil and Plant Nutrient Testing Laboratory
Services: Modified Morgan
Web: http://soiltest.umass.edu/
Phone: 413-545-2311
Email: soiltest@umass.edu

University of Connecticut Soil Nutrient Analysis Laboratory
Services: Modified Morgan
Web: http://www.soiltest.uconn.edu/
Phone: 860-486-4274
Email: soiltest@uconn.edu

University of Vermont Agricultural and Environmental Testing Lab
Services: Modified Morgan, manure
Web: https://www.uvm.edu/pss/ag_testing/
Phone: 802-656-3030
Email: AgTesting@uvm.edu

University of Connecticut Soil Nutrient Analysis Laboratory
Services: Modified Morgan
Web: http://www.soiltest.uconn.edu/
Phone: 860-486-4274
Email: soiltest@uconn.edu

University of Maine Analytical Lab and Soil Testing Service
Services: Modified Morgan, manure, compost, TP and WEP
Web: https://umaine.edu/soiltestinglab/
Phone: 207.581.2945
Email: hoskins@maine.edu

PennState Agricultural Analytical Service Lab
Services: manure, compost, TP and WEP
Web: http://agsci.psu.edu/aasl
Phone: 814-863-0841
Email: aaslab@psu.edu

Spectrum Analytic
Services: Modified Morgan, manure
Phone: 1-800-321-1562
Email: info@spectrumanalytic.com

Dairy One
Services: Modified Morgan, manure
Web: http://dairyone.com/
Phone: 1.800.344.2697 or 607.257.1272
Email: mark.joyce@dairyone.com

If soil test P levels are high or above optimum (>14ppm Modified Morgan extracted P), the risk of P pollution may still be low. Phosphorus becomes a threat to the environment when there is a combination of source AND transfer. Risk of pollution may only be assessed if there is enough information about how the P may be transported to water. For example, there is high risk of pollution from P applications on frozen ground, on slopes greater than 7% or within 25 ft. of a water source. In these scenarios, a field with low or below optimum P levels may actually pose a greater risk of pollution than a high-P field, especially if P was applied right before heavy rains. Another scenario of poor P management would be spreading compost onto a field in the fall without incorporation or a without a cover crop where the P may runoff in the spring with snowmelt into nearby streams. Soils with above optimum P are not a threat to environmental contamination if there is low overland water movement or soil erosion.

Phosphorus mitigation strategies

Symposium attendees came up with quite a few creative P mitigation strategies during round table discussions. Here are some applicable to vegetable growers:

- Identify areas on the farm where there is a large source of P AND high risk of transport. Develop a P mitigation strategy for these fields first.
- When using organic residuals, it is easy to over-apply P when trying to meet a crop's N demands due to the ratio of N:P in the materials. Therefore, calculate P content before making compost or manure applications to meet crop needs, then use an N-based fertilizer such as urea, alfalfa or soybean meal to meet the crop's N needs.
- Do not surface apply organic residuals such as manure or compost before heavy rain.
- If soil test P levels are above optimum, experiment with lower P applications by leaving it off of a few hundred row ft of crop, especially in early spring plantings and then keep track of yields.
- Reduce soil compaction.
- Convert areas of highest risk for P transport to buffer strips.
- Make banded rather than broadcast applications of P-containing materials whenever possible, and incorporate material to 2 inches below seeding depth to allow roots to grow down to meet the P.
- If P-containing residual or fertilizer is applied, consider incorporation to increase mineral binding *and* applying to planted cover to reduce potential soil erosion caused by tillage.
- Use low-P sources of organic residuals such as leaf mulch compost instead of food waste or manure based compost. Poultry litter and pig manure have the highest P-content of compost based fertilizers because their guts lack an enzyme which stabilizes P; ruminants have this enzyme.
- Consider growing high yielding crops such as corn and removing crop residues after harvest.
- Use 'hyperaccumulator' cover crops like mustard, Johnson grass, corn and sorghum or alfalfa to take up P from the soil, then remove and compost the material or feed it to animals to recycle the P.
- Manage soil pH to a range between 6.5-7.2 first, then get a soil test and amend with P afterwards, only if needed.
- Conduct a whole-farm nutrient balance worksheet, making sure to credit all sources of P including from organic residuals and cover crops.

Conduct a risk assessment using the Phosphorus Index to determine risk of P pollution from a particular field. Here is a link to conduct the P-Index on your own:

https://efotg.sc.egov.usda.gov/references/public/MA/MA-P-Index_Version3__May2014.xltx. Or, contact your **local NRCS office** for help with interpretation.

- Maintain regular soil testing practices using the Modified Morgan for soils and ask for testing results of organic residuals wherever you source them from.
- Reduce the amount of P that is imported into our region and onto our soils by using local sources of organic residuals rather than purchasing P fertilizer where possible. Organic residuals such as compost have the added benefit of increasing soil organic matter and water holding capacity which will also reduce P runoff.

Thanks to *Jennifer Weld, PhD Candidate, Soil Science Project Associate and Dr. John Spargo, Director, Agricultural Analytical Services Lab, Penn State University and Dr. Amy Shober, Associate Professor and Extension Specialist Plant and Soil Sciences, University of Delaware and Ned Beecher, Director, Northeast Biosolids and Residuals Association.*

Resources:

Presentations from November 2, 2016 Symposium "Managing Phosphorus in Organic Residuals Applied to Soils": https://www.nebiosolids.org/managing-p-in-organic-residuals-applied-to-soils

Massachusetts Phosphorus Runoff Index (Version 3, 2014): https://efotg.sc.egov.usda.gov/references/public/MA/MA-P-Index_Version3__May2014.xltx

By: Katie Campbell-Nelson, UMass Extension Vegetable Program, December, 2016

kcambel@umass.edu

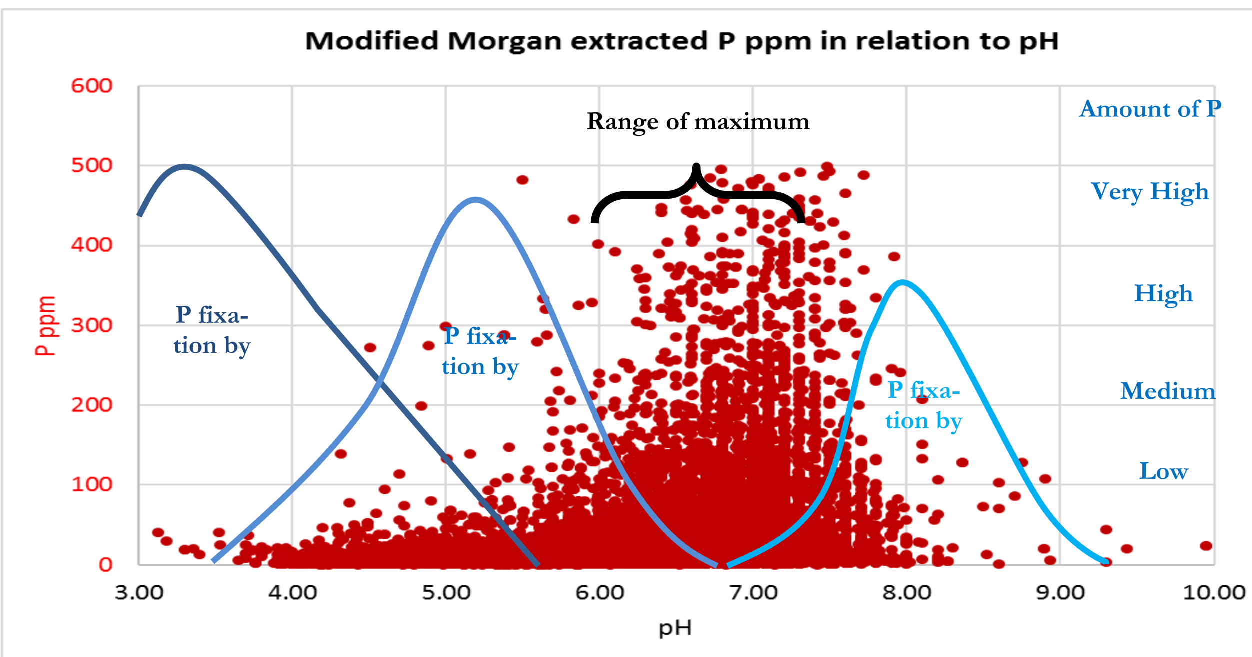

Figure 1 by Katie Campbell-Nelson. The red dots represent Modified Morgan extracted P levels in ppm from over 24,000 soil samples analyzed at the University of Massachusetts and Maine soil labs in 2015. Area underneath the blue lines represent P fixation by iron and aluminum phosphates at low pH and calcium phosphate at high pH.

2016 Massachusetts Corn Hybrid Evaluation

Sarah Weis, Kelly Kraemer, Masoud Hashemi

Many hybrids are available for farmers wanting to plant corn for silage and grain. Some will perform better than others, and some are better suited to the local climate. This report includes silage yield data for 20 hybrids which were submitted for trial by Doebler's and DeKalb. These hybrids should be available for the 2017 growing season. The twenty corn hybrids were evaluated for silage and grain yield at the University of Massachusetts Amherst Crops Research and Education Center, in South Deerfield, Massachusetts in 2016. The soil was a Unadilla silt loam. Each hybrid was assigned to one of four groups based on relative maturity (RM) provided by the seed companies; Group 1; early maturity (RM <95 days), group 2; mid- maturity (RM 95-100 days), group 3; full-season (RM 101-107 days), and group 4; long season (RM>107 days). All hybrids were planted on May 13, 2016. A cone type distributor mounted on a double disc opening corn planter was used in a conventionally prepared seed bed. Plots were planted at the rate of 35,000 seeds per acre in 30 inch rows. Weeds were controlled using glyphosate herbicide applied on June 9th.

Seeding rate was based on 35,000 plants per acre. Plots consisted of 3 rows, 25 feet long and 2.5 feet wide, and replicated 5 times. The site received 100 lbs/acre of nitrogen (calcium ammonium nitrate; CAN) and 80 lbs/acre of gypsum prior to planting, as recommended by an April soil test. Side-dressing was not needed, as determined by a pre side-dress soil nitrate test (PSNT) taken in early July.

Ten foot sections of the central rows were harvested by hand for evaluation of silage yield. Hybrids were harvested by replication on September 14, 21, 22, 28, and 29. Harvested hybrids were evaluated for silage and ear yield, percentage ears, and moisture content. Silage yield was adjusted to 70% moisture and earcorn yield to 25% moisture.

Climate data for the evaluation site is presented in Table 1. Overall, in 2016 the corn crop experienced a hot and very dry growing season with June and July especially dry; crops received only 3" rain as opposed to over 8" which is norm for these two months in this location.

Table 1: Climate data in 2016 for South Deerfield, MA and area norms.

	GDD[1]			Rainfall (inches)		
	2016	Norm[2]	Deviation	2016	Norm[2]	Deviation
May	270	233	37	2.56	3.34	-0.78
June	499	482	17	1.36	4.58	-3.22
July	706	636	70	1.68	3.64	-1.96
August	714	591	123	3.67	3.55	0.12
September	451	348	103	3.56	4.21	-0.65
Total	**2640**	**2290**	**350**	**12.83**	**19.32**	**-6.49**

[1] Growing Degree Days was calculated as: $GDD = \Sigma(T_{max} + T_{min})/2 - 50^{o}$ F

[2] Norms are averages of 19 years, 1997-2015, at nearby Orange airport, Orange, MA

Comparisons of silage yields of corn hybrids are given in Table 2. Hybrids are arranged according to days to maturity. Silage yield adjusted to 70% moisture content averaged roughly 22 tons/acre and ranged from 7 ton/ac to 36 ton/ac in individual plots. There were large differences in yield based on replication where average yields among the five replications ranged from 17 to 28 tons silage.

A summary of relationships between days to maturity and silage yields is shown in bold at the bottom of Table 2. Longest season hybrids out yielded shortest season by an average of 4 ton/acre. Regardless of maturity group all hybrids tested in 2016 yielded poorly compared to previous years. This is very likely related to drought. As mentioned earlier, rainfall in June and July (during rapid growth of corn) was particularly deficient. Drought tolerant hybrids presumably performed best.

Earcorn yield, or percent ears (weight of ears as a percent of total plant biomass), is used as an indicator of quality, with a higher ear percentage connoting higher quality silage (more energy in grain than stover). The longer season hybrids as a group out-yielded the shorter-season hybrids. In many years in the past we found the different RM groups of corn yielded similarly on average. The present superior performance of longer-season hybrids could be due to the ability to assimilate carbon over a longer (and hotter) growing season, inherently allowing the plants to produce superior silage, both in terms of yield and quality. However, using shorter-season corn hybrids provides the opportunity to plant cover crops in a timely manner. Early planting of cover crops not only maximizes the benefits to environment and recovering nutrients, but also provides biomass which can be grazed or cut as baleage in the following spring.

When choosing a hybrid, time to harvest is a consideration if a cover crop is to be planted in the fall. The shortest season hybrid tested this year gave average yield and better than average quality (as defined as percent ears) and could be harvested at the very beginning of September in the Pioneer Valley in Massachusetts. This could be a good choice if an early cover crop is to be planted. The longest season hybrids at 111 and 112 days RM gave the highest yields and also higher than average quality. Note that 3 hybrids (designated " v " at far right in Table 2) were from 2015 seed.

Table 2. Data related to corn silage hybrid evaluation in MA, 2016.

RM Category	Days to Maturity	Percent Ears[z]	Silage Ton/ac[y]	Earcorn Ton/ac[x]	Relative Moisture[w]	Hybrid	
1	93	67	22	5.8	1.00	Doebler's	RPM® 3316AM™
1	93	61	22	5.6	1.06	DeKalb	DKC43-48RIB[v]
1	94	54	16	3.9	1.16	DeKalb	DKC44-13RIB[v]
2	95	65	23	6.1	1.10	DeKalb	DKC45-65RIB
2	96	59	18	4.3	1.06	DeKalb	DKC46-20RIB
2	96	65	18	4.8	1.14	DeKalb	DKC46-36RIB
2	99	65	21	5.5	1.13	Doebler's	3916GRQ™
2	99	64	23	6.0	1.12	DeKalb	DKC49-72RIB[v]
3	101	66	22	5.8	1.11	Doebler's	RPM® 4115 AM™
3	102	65	24	6.1	1.17	DeKalb	DKC52-30RIB
3	104	62	19	4.8	1.19	DeKalb	DKC54-38RIB
3	105	66	22	6.0	1.11	DeKalb	DKC55-20RIB
3	105	66	26	6.8	1.25	Doebler's	RPM® 563HXR™
3	107	59	24	5.9	1.25	Doebler's	RPM® 4717AM™
4	108	69	22	6.0	1.15	DeKalb	DKC58-06RIB
4	109	58	20	5.1	1.29	Doebler's	RPM® 4917AM™
4	110	67	23	6.2	1.23	DeKalb	DKC60-67RIB
4	111	66	25	6.7	1.21	DeKalb	DKC61-88RIB
4	111	66	27	7.3	1.22	Doebler's	RPM® 5125AM™
4	112	69	25	7.0	1.19	DeKalb	DKC62-08RIB
Average		**64**	**22**	**5.8**			
LSD[u]		9	6	1.8			
Shorter- Season (<95 days)			**19.8**	**5.1**	**1.07**		
Mid-maturity (95-100 days)			**20.7**	**5.6**	**1.11**		
Full-Season (101-107 days)			**22.8**	**5.9**	**1.18**		
Long-Season (>107 days)			**23.8**	**6.4**	**1.22**		

[z] Percent ears is reported on a dry weight basis.

[y] Silage yield is reported as US tons per acre of 70% moisture plant material at harvest .

[x] Earcorn is reported as tons per acre of ears in the husk at 25% moisture.

[w] Moisture relative to the earliest maturing hybrid at early harvest.

[v] 2015 Seed. Plant population using the 2015 seed averaged 93 plants/100 seeds while 2016 seed averaged 94 plants/ 100 seeds.

[u] LSD , least significant difference is the smallest difference between any two values in the above column in which a difference is considered to be of statistical significance at odds of 19 in 20.

Comparisons of grain yields are given in Table 3. Hybrids are arranged according to reported days to maturity for silage. Summary of relationships between days to maturity and grain yields are shown at the bottom of the table in bold. Note that any effects of "days to maturity" may be related to choice of seed the companies opted to send for trials. Drought was undoubtedly a factor in reducing yields relative to prior years. Grain yields averaged between 152 bu/ac and 226 bu/ac, with full season hybrids out yielding short and mid-season hybrids overall. There was considerable yield variability among the 4 plots of each hybrid. For two hybrids to show statistically significant yield differences, the average difference must exceed 33 bushels/ acre. Moisture content of the grain at harvest was related to "days to maturity", with the short season hybrids averaging lowest moisture and the long season hybrids averaging highest moisture. Two replications were harvested November 18 and the other two were harvested November 22. Overall, average moisture content dropped from 17.8% on November 18 to 17.2% on November 22. Note that these are essentially the same moisture percentages recorded in 2015 on December 16 and 21. Moisture percentages shown in Table 2 are averages of the two harvest dates.

Table 3. Grain corn yield, 2016 season, as harvested November 18 and 22, 2016.

Hybrid Number	Days to maturity	Maturity Group	bu/ac @ 15.5% moist.	Harvest Moist. %[z]	Protein Pct.	Hybrid
11	93	1	152	16.8	7.7	Doebler's RPM® 3316AM™
18	93	1	185	16.2	7.4	DeKalb DKC43-48RIB[x]
19	94	1	175	17.0	7.7	DeKalb DKC44-13RIB[x]
1	95	2	177	17.1	7.7	DeKalb DKC45-65RIB
2	96	2	179	17.0	7.8	DeKalb DKC46-20RIB
3	96	2	187	17.45	7.7	DeKalb DKC46-36RIB
12	99	2	159	17.6	7.6	Doebler's 3916GRQ™
20	99	2	189	17.2	7.8	DeKalb DKC49-72RIB[x]
13	101	3	176	17.5	7.0	Doebler's RPM® 4115 AM™
4	102	3	178	17.85	7.4	DeKalb DKC52-30RIB
5	104	3	193	17.75	7.2	DeKalb DKC54-38RIB
6	105	3	181	17.5	7.1	DeKalb DKC55-20RIB
14	105	3	196	18.95	7.5	Doebler's RPM® 563HXR™
15	107	3	177	19.1	7.5	Doebler's RPM® 4717AM™
7	108	4	191	18.55	7.0	DeKalb DKC58-06RIB
16	109	4	193	19.95	7.4	Doebler's RPM® 4917AM™
8	110	4	177	18.9	7.8	DeKalb DKC60-67RIB
9	111	4	190	18.9	7.6	DeKalb DKC61-88RIB
17	111	4	226	18.75	7.0	Doebler's RPM® 5125AM™
10	112	4	197	19.7	7.6	DeKalb DKC62-08RIB
LSD[y]			33	1.2	0.38	
Short Season (<95 days)		**1**	**171**	**16.7**	**7.6**	
Mid-Season (95-100 days)		**2**	**178**	**17.3**	**7.7**	
Full Season (101-107 days)		**3**	**184**	**18.1**	**7.3**	
Long Season (>107 days)		**4**	**194**	**19.1**	**7.4**	

[z] Moisture was measured at the time of harvest using a Dickey-john® mini GAC® moisture tester.

[y] LSD , least significant difference is the smallest difference between any two values in the column above it which is considered to be of statistical significance at odds of 19 in 20.

[x] Seed planted was for 2015.