



# MARYLAND MILK MOOS

## Current Research

The University of Maryland Department of Animal and Avian Sciences, in collaboration with the University of Maryland Extension -Washington County office, has been conducting innovative applied research relating to dairy nutrition and dairy extension work for Maryland dairy farmers.

### Effect of Extended Colostrum Feeding on the Performance of Jersey Heifers

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This study aimed to investigate how extended colostrum feeding in Jersey heifer calves can affect their growth and development. Research has shown beneficial results in Holsteins, but research has not been done on the Jersey breed. Colostrum is the first milk any mammalian mother gives. It is rich in antibodies known as immunoglobulins. It is essential for any newborn to intake colostrum to receive what is known as the passive transfer of immunity, as a newborn's immune system is underdeveloped and has no exposure to the outside world. Colostrum is also higher in protein and fat compared with regular milk. After about 24 hours, the composition of the colostrum will begin to transition into regular milk, so it is essential that the newborn nurses and consumes colostrum as soon as possible.

The experiment was conducted at the Shenandoah Jerseys farm in Boonsboro, Maryland. We would like to thank the Hess family for allowing us to use their herd for this study.

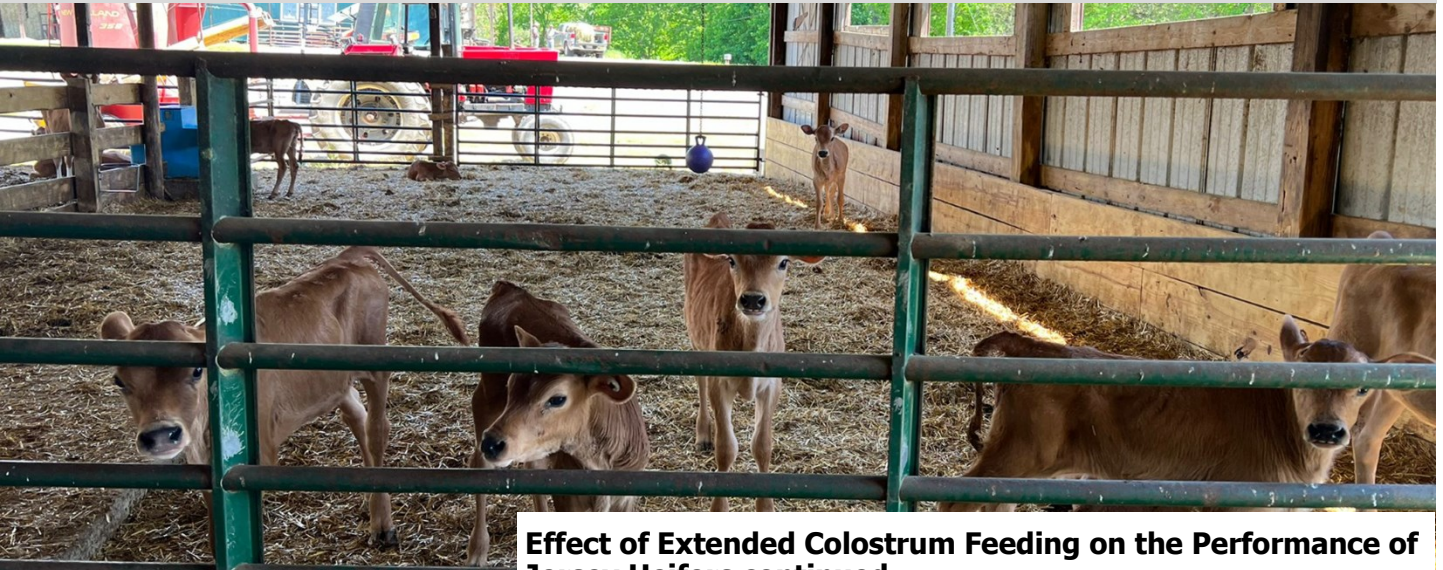
## Inside This Issue

Current Research	1
Managing Corn	4
Transition Cows	10
Notice to Beneficiaries	13

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## Maryland Milk Moo



**Effect of Extended Colostrum Feeding on the Performance of Jersey Heifers continued...**

### Focal point

- ◆ The University of Maryland Department of Animal and Avian Sciences along with the University of Maryland Extension Service have been collaborating on applied dairy research.
- ◆ One project in collaboration with the Washington County Extension Service involved an experiment investigating the effects of extended colostrum feeding on the growth and development of Jersey heifer calves.
- ◆ Another project aims to assess the knowledge and understanding dairy farmers have on mycotoxins and microorganisms (specifically clostridium) on contamination of their TMR. This project involves a survey, visiting farms for feed samples to test for contamination, and supplying farmers with educational materials.

- After the calves were born, they were placed in a solitary pen.
- Control group: 2 total colostrum feedings, 1 day
- Treatment Group: 6 total colostrum feedings, 3 days (2X day)

After their colostrum feeding period was finished, they were all moved to a group pen with a free choice milk feeder that fed milk replacer until they were weaned at 77 days. Calves from both groups were housed in the same group pen, the only difference was during the colostrum period.

Data was collected for body weight, heart girth, and hip height.

- Heart girth is a measurement of the circumference of the animal's body. A tape measure is wrapped around the animal right behind the shoulder blades.
- Hip height was measured using a ruler with a balance beam placed at the rump of the cow.

The data found that there was a tendency towards significance for an increase in weaning weight, average daily gain, and heart girth for the treatment group compared to the control group. Hip height did not differ significantly between groups. Birth weight did not differ significantly between groups indicating that the treatment group did not have an advantage at birth. These results indicate that extended colostrum feeding for jersey calves leads to accelerated weight gain and fuller bodied calves at weaning.

The calves will now be tracked all the way till their first lactation to assess differences in reproduction and lactation between treatment and control groups. This will be the deciding factor on whether or not it is economically feasible to have extended colostrum feeding in Jersey calves.

## Maryland Milk Moo

### Effect of Extended Colostrum Feeding on the Performance of Jersey Heifers continued...



Bodyweight  
Image credit: Fabiana Cardoso



Heart Girth  
Image credit: Fabiana Cardoso



Fabiana Cardoso (Left), Niraj Suresh (Right)  
Image credit: Eduardo Rico

These results were presented as a poster at the American Dairy Science Association (ADSA) Annual Meeting by Niraj Suresh, a master's student working under Dr. Fabiana Cardoso. Other authors include Jeff Semler; a principle extension agent in Washington County, Sarah Potts; a former beef and

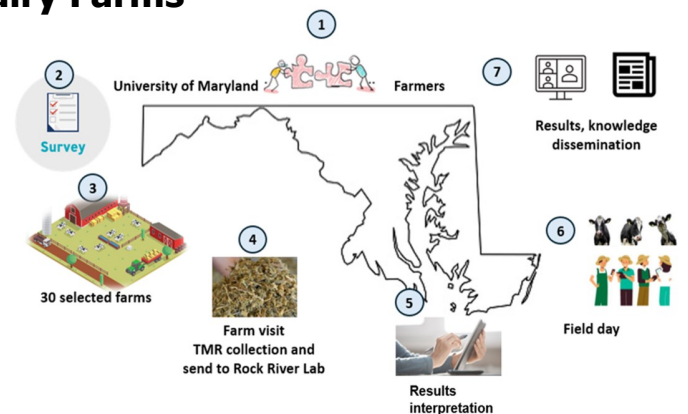
dairy extension specialist, and Emily Stamper. The ADSA annual meeting is internationally recognized as the premier dairy science conference. The poster received positive feedback from various respected scientists from several institutions across the globe.

## Microorganisms in Feed on Maryland Dairy Farms

Another project currently being conducted is an extension based project involving analyzing Maryland dairy farmer's knowledge of feed contamination from mycotoxins and clostridium, testing their feed, and afterwards supplying them with educational materials to improve their feed management.

A survey was sent to 293 dairy farms across the state to assess their knowledge, concerns and experiences with mycotoxins and clostridium contaminating their corn silage and total mixed ration (TMR). As of July 30, 53 farms have responded. We have just sent out a follow up letter to encourage more responses.

The survey inquired on things such as the size and production of each farm, and details such as breeds of cow and feedstuffs that are used. The farmers were then asked about their corn silage and TMR management, knowledge of contamination, and experiences with mycotoxins and clostridium. It is



Multifaceted approach to reduce feed contamination in Maryland dairy farms. Image credit: Fabiana Cardoso

worth noting that a some dairy farms in Maryland are grassfed operations so the survey did not apply to them. Farmers were also asked general questions such as if they needed help with anything else, if the survey was helpful, and if they are interested in educational resources.

## Maryland Milk Moo

### Microorganisms in Feed on Maryland Dairy Farms continued...

In the next step we will be visiting dairy farms that are willing to have us to sample their feed and test for mycotoxins and clostridium. We can use this data to better understand the prevalence of mycotoxins and clostridium in Maryland corn silage and TMR. Afterwards, we will come back to the farms with educational materials to reduce their feed contamination. These educational materials will be free of charge and offered in several different formats to allow farmers with different media capabilities and preferences to understand the material. Finally, a field day will be conducted to provide a group learning setting.



Graduate student Niraj Suresh consulting with a Maryland dairy farmer. Image credit: Fabiana Cardoso



## Managing Corn

### Optimizing Corn Silage: Planting Decisions

**Niraj Suresh and Fabiana Cardoso**

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Corn silage plays a major role in dairy nutrition. For the vast majority of dairy farms in Maryland and then nation, corn silage will make up the majority of the ration. Corn silage is a complex feed, there are several steps that must be taken to make, preserve, and feed high quality corn silage to maximize milk production. These include things such as planting and production of the corn, harvesting and packing the corn plant, storage of the silage, and proper feeding management strategies. This article will focus on different management strategies to consider when planting corn that will have a significant effect on the yield and nutritional value of the crop.

## Focal point

- ◆ Corn is the main feedstuff for the majority of dairy farmers in Maryland.
- ◆ Corn Silage is the most common way to feed corn for dairy cows, it is unique in that it uses the whole plant, not just the kernels.

### Optimizing Corn Silage: Planting Decisions continued...



Image credit: University of Minnesota Extension

Making good silage starts with planting the seed. Proper planting strategies should be a priority. If the corn does not grow, no silage can be made.

The planting decisions we will discuss are:

- Soil Preparation
- Planting Date
- Row Spacing
- Planting Depth
- Seed Spacing

#### Soil Preparation

The farmer must ensure proper seed placement and seed to soil contact. In the past, tillage was seen as a necessity. However, in recent years with modern planting technology, corn can be planted in many different soil conditions. Very deep and silt loams with a high moisture capacity seem to give the best corn production. Generally speaking, the better the moisture and drainage of the soil, the better the corn production.

#### Planting Date

The best time frame for planting corn will vary with geographic region. Corn is a summer annual, meaning it will be planted in the Spring, grow throughout the Summer, and be harvested in the Fall. The ideal soil temperature for proper

#### Focal point continued...

- ◆ Corn silage must be fermented in a silo, this process is called ensiling.
- ◆ In this article we will discuss 3 major aspects of growing corn: Planting, Ensiling, and Harvesting.

germination is around 50 degrees Fahrenheit. In Maryland, the soil normally reaches this temperature around late April. Planting at this time will allow for an optimal growth period.

#### Row Spacing

Row spacing refers to how much distance is in between each row of corn in the field. The standard practice is to plant with a row spacing of 30 inches. Recently there has been considerations to maximize corn yield in a given parcel of land by reducing row spacing and also utilizing twin rows. Use of 15 and 20 inch rows are now being seen. Twin rows are when 2 rows for corn are planted extremely close together and a larger space such as the standard 30 inches will separate the twin rows. Several studies have indicated improved yield when using these 2 methods. It is up to the farmer to consider whether or not reducing row spacing or using twin rows is feasible. Farmers with smaller farms may be more inclined to consider these options.

### Optimizing Corn Silage: Planting Decisions continued...

#### Planting Depth

The standard depth for planting corn seeds is 2 inches. This allows for ideal germination and is seen in the majority of operations. Generally speaking, the broad range of planting depth for corn will be anywhere from 1.5-3 inches. 1.5 inches can be beneficial in cooler, wetter soils. In warmer, drier soils, planting deeper can be beneficial.

#### Seed Spacing

Seed spacing will vary with row width and the amount of seeds per acre. One way to calculate seed

spacing in inches is by using this equation:

$$\frac{(43,560/\text{seeds per acre})}{(\text{row spacing in inches}/12)} \times 12$$

43,560 is the amount of square feet in 1 acre.

#### References

1. Lawrence, J. (2022). Corn Silage: From Seed to Feed. *Hoard and Sons*.
2. University of Minnesota Extension. (N.D.). Corn Planting. *Crop Production*.



Image credit: Niraj Suresh

### Considerations when Harvesting Corn

Corn is a major feedstuff for all livestock species. Unlike other industries such as swine and poultry, dairy farmers often use the entire plant by making whole plant corn silage. Today, harvesting is a highly mechanized process. Farmers use corn harvesters, specialized machines that chop the corn. In this article, we will talk about things to consider when harvesting corn to make silage.

#### Considerations:

##### Type of Forage Harvester

There are 2 main types of forage harvesters, pull-type harvesters and self propelled harvesters. Pull type harvesters require a separate power unit to operate, self propelled do not. Self propelled

harvesters are generally viewed as more efficient and easier to use, whereas self propelled are more versatile and cost much less. Farm size will play a major role in what harvester works best.



Image credit: University of Maryland Extension

## Maryland Milk Moo

### Considerations when Harvesting Corn continued...

#### Theoretical Length of Cut

The theoretical length of cut (TLOC) is a unit that describes how long the harvester will make the pieces of shredded corn plant or “chop” when harvesting. A longer chop increases fiber content whereas a shorter chop is better for proper ensiling regarding air infiltration. For corn, the general recommendation for TLOC is 1/2 to 3/4 inches.

#### Kernel Processor

Kernel processors in corn harvesters are rollers that crush and shear the corn as it passes through. The space in between can be configured depending on your goals. Settings generally range for 0.03 to 0.12 inches. Speed differentials generally range from 10% to 40%. Kernel processors should be checked often and well maintained to ensure quality silage.

#### Field Capacity and Efficiency

Field capacity is the area a machine harvests per area of operation. Field efficiency refers to the time a machine is harvesting. Considering these can allow you to assess how long it will take to harvest your corn and compare your harvester to others.

#### Harvester Technology

Modern harvesters are outfitted with amazing technologies. These include inoculant application systems, automated machine guidance, and forage quality sensors measuring details such as moisture. It is up to the farmer to decide what is essential to them, as increased technology will lead to increased price.

#### Cutting Height

Research has indicated that increasing the cutting height of corn can increase the nutritional value. High cut corn sees increases in dry matter, crude protein, and starch with a decrease in neutral detergent fiber (NDF) and acid detergent fiber (ADF). This can allow for an increased proportion of forage opposed to corn grain in the TMR which is more affordable for the farmer.

Whole plant corn silage is a major part of most dairy rations. Ensuring the corn is harvested correctly is necessary to be able for correctly ensiling the corn as well as the digestibility once the silage is made. This will allow for better herd health, milk production, and profitability of the farm.



Image credit: Arvalis



Image credit: Nebraska Lincoln Cropwatch

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2. Cherney et al. (2021). Does Your Corn Pass the Silage Harvest Test?. Hoards Dairymen. <https://hoards.com/article-30772-does-your-corn-pass-the-silage-harvest-test.html>
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5. Arvalis. (2016). Raising maize whole plant cutting height allows getting a better nutritive value for the harvested forage. Dairy Global. <https://www.dairyglobal.net/general/the-effect-of-maize-cutting-height-on-cows/>



Image credit: Niraj Suresh

## Ensiling Management for Corn Silage

**Niraj Suresh and Fabiana Cardoso**

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In Maryland, corn used for livestock feed will normally begin to be harvested in late September and in to October. After this dairy farmers planning to use corn for whole plant corn silage will begin ensiling the chopped corn (green chop) to allow it to ferment and eventually become corn silage. Ensiling corn is an intricate process that must be done correctly or else the farmer risks suboptimal or even spoiled feed which can have catastrophic consequences for a dairy operation. In this article we will share some tips to ensure that your corn can be ensiled correctly and ferment to make great feed.

### Preparation:

- Have a well thought out plan beforehand: Ensiling must be done quickly for the best results, have everything ready to go before you begin. Know exactly what you want to do and make sure everyone is on the same page. Make sure to plan according to the weather as well.
- Have the right equipment: Due to the impact it will have on your feed and performance, ensiling is one of the most important processes on the farm. Make sure you have the best equipment possible and consider renting. Having the best silage, you can should be a top priority. For

example, if you don't have the best tractors for packing, consider renting a really good tractor from another farmer.

- Make sure the silo is clean: Remove all old feed and debris from the silo before you start packing it. This will allow for you to have the best possible feed and avoid contamination from microorganisms and mycotoxins.

### Ensiling:

- If you are using a bunker silo, line the wall with plastic to limit oxygen penetration.
- When using a tractor to pack, go over the corn multiple times to make it as even as possible.
- Slope the silage down 1 to 2% away from the feedout face to encourage drainage from the face of the feedout area.
- Cover the feed as soon as possible when done packing. It should be done no later than 24 hours and preferably right after the feed is packed.
- Make sure to have adequate weight over the plastic cover, tires and sandbags are most commonly used with gravel or soil at the end on the ground.



## Maryland Milk Moo

### Ensiling Management for Corn Silage continued...

- Use a tarp to protect the cover from weather and vermin.
- If using a tower silo, a forage distributor can be used to have a more even compaction throughout the silo.
- When overlapping sheets, make sure there is at least 4 feet of overlap in between sheets to ensure proper sealing.
- When walking on the plastic sheets, wear shoes that are less likely to tear it.

Having good silage is an essential for the vast majority of Maryland dairy farmers. A good farmer will make ensiling a top priority. For some farmers, it is only one day in the entire year. That one day can make or break their operation. Taking the proper steps when ensiling corn will ensure the corn has a proper fermentation process.

### References

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Image credit: Niraj Suresh



Image credit: Niraj Suresh



Image credit: Niraj Suresh



# Transition Cows

## Understanding the Transition Period

**Niraj Suresh and Fabiana Cardoso**

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The transition period in dairy cows is a critical phase that spans from the last three weeks before calving to the first three weeks after calving. This period is marked by significant physiological, metabolic, and behavioral changes that prepare cows for the demands of lactation. Proper management during this time is crucial to ensure optimal milk production and overall health.

### Prepartum Phase: Key Changes and Challenges

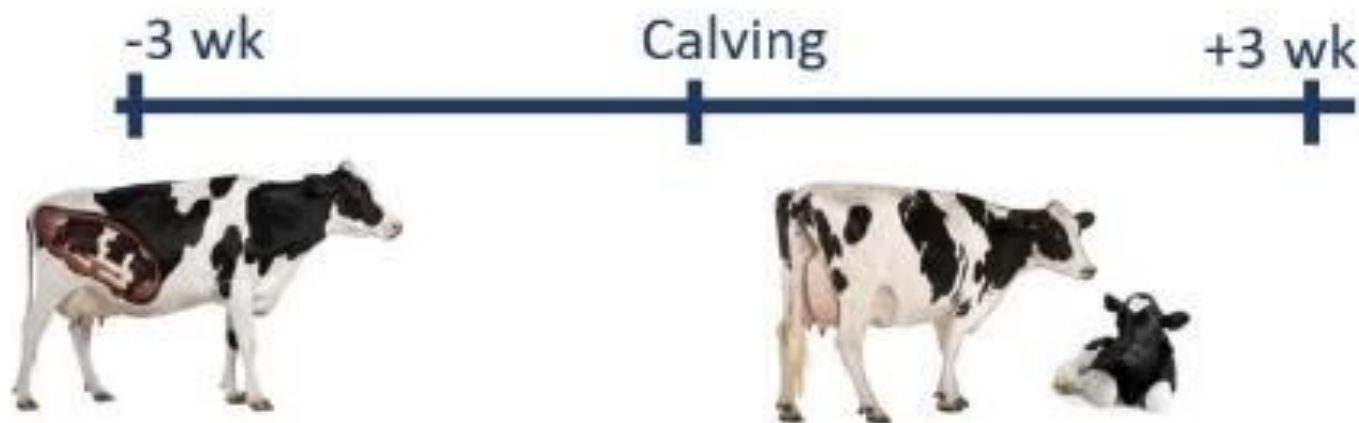
During the prepartum phase, cows experience rapid fetal growth, mammary gland development, colostrum synthesis, and significant endocrine changes. These changes prepare the cow for the increased energy demands after calving. However, cows also face a drastic reduction in dry matter intake (DMI), decreasing by approximately 30% during the last week before calving. This reduction, influenced by factors like body weight, parity, gestation days, body condition score (BCS), health, dietary digestibility, farm management, and climatic conditions, poses a major concern as it leads to negative energy balance (NEB) and negative protein balance (NPB).

### Tips for Managing

- Monitor body condition score (BCS) regularly.
- Ensure balanced nutrition to support fetal growth and mammary gland development.
- Minimize stress by maintaining consistent groupings and avoiding overcrowding.

## Focal point

- ◆ The transition phase is the last 3 weeks before calving and the first 3 weeks after calving.
- ◆ The cow undergoes significant changes, with metabolism being a key focus due to its potential effect on the cows health due to a drastic increase in energy demand.
- ◆ Proper management of nutrition and the cows environment are essential to ensure the health of the cow, a safe calving, and optimal milk production.
- ◆ Some of the most significant diseases seen in dairy cattle occur during this phase due to the metabolic changes.



The 6 Week Transition Period. Image credit: Fabiana Cardoso

### Postpartum Phase: Nutritional and Metabolic Adjustments

After calving, cows' nutritional demands spike due to rapid milk production. The NEB, which begins a few days before calving, becomes more pronounced postpartum and typically lasts until the fifth week after calving. High-producing dairy cows prioritize nutrients for mammary gland function, exacerbating NEB. Consequently, cows mobilize body fat, leading to increased production of non-esterified fatty acids (NEFA) and potential immunosuppression.

### Metabolic and Health Implications

Cows in NEB are more prone to body fat mobilization, weight loss, reduced BCS, and fatty liver disease. The mobilization of lipid and protein reserves, particularly adipose tissue, negatively impacts cow performance.

### Tips for Monitoring Metabolic Health:

- Keep detailed health records for each cow.
- Conduct regular blood tests to monitor NEFA and BHB levels.

### Strategies for Transition Period Management

Adopting effective dietary strategies, such as well-balanced diets, controlled energy diets, and negative DCAD (dietary cation-anion difference) diets, along with proper lot management and climate control, can mitigate the negative effects of the transition period. These practices help maintain DMI, manage NEB, and prevent metabolic disorders.

### Key Management Strategies:

- Implement a well-balanced diet tailored to the needs of transitioning cows.
- Control energy intake to prevent excessive body fat mobilization
- Monitor for signs of metabolic disorders such as ketosis and fatty liver
- Maintain optimal environmental conditions to reduce stress.

### Immunological Challenges and Disease Management

The transition period also brings immunological challenges, making cows susceptible to metabolic disorders like ketosis, fatty liver, displaced

## Maryland Milk Moo

### Understanding the Transition Period continued...



The transition period affects the cow and operation in several ways. Image credit: Fabiana Cardoso

abomasum, and retained placenta. Approximately 75% of dairy cow diseases occur within the first month after calving, leading to significant economic losses. Effective nutritional management and feeding strategies are essential to maximize cow potential and ensure health during this critical period.



Image credit: Niraj Suresh



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