



### Management Guidelines for Immature and Frosted Corn Silage

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Management adjustments are needed when harvest maturity is not ideal.



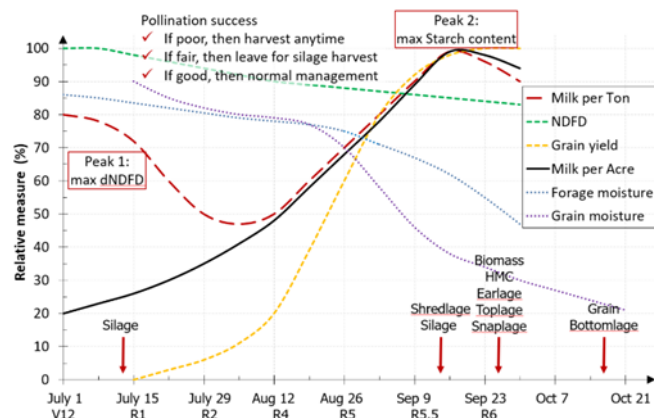
Extreme weather and delayed planting make it certain that some fields planted for corn silage will not have time to reach optimum maturity this year before frost brings an end to the growing season. Michigan State University Extension has collated information from across the northern Corn Belt to assist producers with management guidelines for ensiling immature and frosted corn in this year of extremes.

The greatest challenge of harvesting immature and possibly frosted corn for silage is that it is very likely to be too wet for ensiling. Target moisture at ensiling in bunkers and piles is 65-70% while corn ensiled in upright silos should be a little dryer at 60-65% moisture. More than 70% moisture leads to clostridial fermentation and excessive effluent loss, resulting in increased dry matter shrink, reduced nutritive value, reduced dry matter intake by cows and economic loss. Silo effluent is also a regulatory issue because it cannot be allowed to contaminate surface water.

#### Harvest timing and silage quality

Corn is a grass and exhibits the same trade-off between dry matter yield and forage quality in the early growth stages as other grasses. Corn is unique among forages in that the developing grain allows an increase in nutritive value to compensate for the decline in fiber digestibility (NDFD) as plants mature. University of Wisconsin research shows that milk per ton of corn silage declines from prior to flowering until R3 (milk) growth stage before recovering and peaking at R5.5 (half milkline), while milk per acre continues to increase throughout this period (see figure).

Milk production per ton of forage may be 46-63% lower at milk stage versus earlier or later stages. Therefore, if weather projections indicate corn will not be able to achieve R5 or greater before cold weather stops growth and best forage quality is the main objective, it may be better to harvest before R1. This immature corn also has greater sugar content and crude protein and more digestible cell wall than normal corn silage.



Source: Joe Lauer, University of Wisconsin,  
<http://corn.agronomy.wisc.edu>

It takes corn about 900 growing degree days (GDD) after silking to reach silage maturity. When planted at the normal time of year, this takes about 45 days. When planted later, it takes longer to accumulate 900 GDD after silking because growth is pushed into a cooler time of year, and development slows down to require 55 to 70 days to silage maturity. Therefore, corn planted in mid-July or later has little chance of reaching maturity before frost in Michigan. Corn may withstand temperatures of 32° Fahrenheit for up to four hours with minimal damage, but only a few minutes below 28° F. Be aware that frost damage can vary across a field due to differences in topography and exposure. Frozen tissue will quickly turn dry and brown. **Be careful! Recently frosted immature corn can still be too wet to ensile even if the leaves seem completely dry because most of the moisture is in the stalk.**

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## Business Project Funds

With a preference for small to midsize farms, projects will address specific business needs necessary to meet the challenges of today and position the farm for long term viability.

**Program funds may be used to engage the services of a dairy industry professional for the following categories:**

Funds will cover 80% of eligible costs up to:

**Recordkeeping systems - \$2,500** for implementation and support of a new, or significant update to an existing, record keeping system

**Operational planning - \$2,500** for a farm's first year of budgeting and planning with an operational focus to assist with analyzing costs and opportunities for improvement of current operations

**Advisory Team - \$3,000** for a team of advisors to assist the farm with improvement of specific aspects of dairy business performance

**Business planning - \$5,000** for a farm to develop a business plan which may include, but is not limited to business planning and analysis of operation, transition analysis, facility planning and farmstead layout planning

**Business planning (cont.) - \$2,500** for continuation of business planning for a farm awarded business planning funds in a subsequent year

*Business projects are funded through the NYS Department of Agriculture and Markets with additional funds provided by*

**Chobani**

# Three Approaches for Determining Fair Farmland Rental Rates

Mary Kate Wheeler, Farm Business Management Specialist  
South Central NY Dairy and Field Crops Team

Agricultural renters and landowners alike seem to struggle with the same question: what is the right rental rate for agricultural property? I commonly hear this question from beginning farmers seeking land. Yet, just as frequently, it comes from landowners searching for a farm tenant. Although owners and renters may find themselves on opposite sides of the bargaining table, in general both parties are looking for a fair rental rate that does three things:

1. Reflects local agricultural and market conditions.
2. Compensates the owner for costs associated with property ownership.
3. Allows the tenant to operate a viable farm business and maintain the property in good condition.

If both parties come to the table with these three goals in mind, then they have a good shot at working out a lease agreement and a rental rate that meet everybody's needs. Assuming, of course, that the tenant has a viable business plan.

If you find yourself in this position, you have multiple options for how to come up with a rental value. This article sets out three distinct strategies for determining farmland rental rates. While the best method will depend on your own unique set of circumstances, using a combination of these strategies can help you arrive at a solution that works for both parties.

## The Going Rate in Your Area

One strategy to determine a fair rental price is to look at current rental values for similar properties nearby. This strategy works best when there are comparable rental agreements in your locale. It may be hard to find a good "comp" for a whole farm rental that includes land, facilities

and equipment. However, in most agricultural communities it is easy to determine a typical market rate for renting farmland.

Cash rental rates reflect the value of what the land can produce, as well as the demand for agricultural land in your area. Land that is more productive and easier to work will be more expensive to rent than land that is less productive and harder to work. Soil type, slope, aspect, accessibility and prior management all influence land quality and rental price. Competition between farms can drive prices up when the demand for farmland in your area exceeds the supply.

The best way to gather information about rental rates is to talk with other farmers and landowners in your neighborhood. Find out what their rates are, and ask about any additional stipulations in their lease agreements that might affect the price. Prices can vary widely, even within a single locale, so it is best to gather information about comparable properties.

You can also use data from the USDA National Agricultural Statistics Service (NASS) to develop a sense of typical rental rates in your area. NASS reports average rental rates for cropland and pastureland at the county level. However, they do not report the range of rental values. Average rental rates provide little guidance on how to price land that is significantly more or less productive than average.

## Owner's Carrying Cost

Most owners and renters will agree that a fair rental price should compensate the owner for any expenses associated with owning the property. Owners are typically responsible for paying taxes and insurance on property held in their name, and they often pass on other routine costs to their tenants, such as electricity, repairs, and maintenance.

Owners also incur an opportunity cost of keeping their capital invested in a property. While this is not a cash expense, it is a real economic cost. As an owner, if you were to sell your property and invest the earnings in a financial account, you would expect to see a rate of return on your

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### To find average rental rates for agricultural land in your county:

1. Go to the USDA NASS Quick Stats website: <https://quickstats.nass.usda.gov>
2. Under the Commodity heading select "RENT".
3. Under the Data Item heading, select your desired land type. Most counties have price data available for non-irrigated cropland and for pastureland. Be sure the option you select is measured in \$/acre.
4. Under the Geographic Level heading, select "COUNTY".
5. Select your state and then your county from the corresponding lists.
6. Select the most recent year available under the Year heading.
7. Click on the "Get Data" button at the bottom of the screen.
8. A table will appear showing the average value (\$/acre) for the county and land type that you selected. This value will appear in the very last column on the right hand side of the table.
9. You can hold down the Control key to select multiple land types, counties, and/or years - this will generate a table with multiple rows.



investment. Your opportunity cost of owning farmland is the loss of potential gains from other possible uses of the capital you have invested in the farm.

If you are an agricultural property owner, consider what rate of return you would be willing to accept from a rental agreement. Appreciation of agricultural land values may also contribute to your return on investment. For example, assume your property value appreciates by 2% per year and you earn a 3% rate of return from your tenant. That represents a 5% annual rate of return overall. Some owners may be willing to accept a lower rate of return from their rental agreement if the tenant's activities help to maintain or increase the property value over time.

Understanding the owner's carrying cost is especially helpful for determining rental rates when an agricultural property includes buildings and equipment. Here is a fictional example of how two parties might apply this method:

A livestock farmer (tenant) is negotiating a rental agreement for a farm property that includes land, fencing, animal housing, and storage structures. The property has a market value of \$400,000. The property owner pays \$10,000 annually in property taxes and insurance. The tenant agrees to pay for electricity and other utilities, and take responsibility for the cost of routine repairs and maintenance. The owner is willing to accept a 2% rate of return, which represents the opportunity cost of keeping their capital invested in the property. A 2% rate of return on the \$400,000 assessed property value is \$8,000. Both parties agree to a cash rental rate of \$18,000 per year, or \$1,500 per month.

### Tenant's Business Plan & Budget

A third strategy for determining a rental rate is to figure out what the tenant can afford. If you are the tenant, you should sketch out a business plan and develop a budget that includes the cost of renting land and facilities. This recommendation applies regardless of which strategy you use to settle on a rental price. Having a budget will help you to avoid signing a rental agreement for a property that you cannot afford.

If you are not sure what rental value to use in your budget, start by plugging in a value based on going rental rates, or based on your estimate of the owner's carrying cost. Once you have a plan and a budget, look at your numbers and ask some critical questions:

- What percentage of my earnings will go toward rent? Is this normal for my industry?
- Will I have enough cash flowing into the business to cover my monthly/annual rental payments?
- Will my business fully utilize the property in the first year? If not, will it grow to fully utilize the property at some point in the future?
- Will my business be profitable in the first year? If not,

when will it become profitable?

Answering these questions can help you negotiate rental values and terms that make sense for your business. If you face a significant cost to transition into the new property,

### Cash Rents for Cropland in 2019

Average Rental Values for the Top 5 and Bottom 5 States

Source: USDA NASS, 48 states reporting

Rank	State	\$ per Acre
1	California	\$423.00
2	Hawaii	\$271.00
3	Arizona	\$249.00
4	Iowa	\$230.00
5	Illinois	\$224.00
44	New Hampshire	\$44.00
45	West Virginia	\$43.00
46	Texas	\$42.50
47	Oklahoma	\$34.50
48	Montana	\$32.50

### Cash Rents for Pastureland in 2019

Average Rental Values for the Top 5 and Bottom 5 States

Source: USDA NASS, 45 states reporting

Rank	State	\$ per Acre
1	Iowa	\$59.00
2	New Jersey	\$45.00
3	Maryland	\$44.00
4	Indiana	\$43.00
5	Illinois	\$41.00
41	Colorado	\$6.10
42	Wyoming	\$4.40
43	Utah	\$4.30
44	New Mexico	\$2.80
45	Arizona	\$2.00

perhaps the property owner would agree to a discounted rental rate in the first year. If you anticipate significant growth in your business, you might propose a rental rate that increases over time as your earnings and your utilization of the property grow. Demonstrating that you have a viable business plan can build trust with the property owner and increase their confidence in your management abilities.

### Other Considerations

These three strategies give you a starting point for

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# Is Salary Pay the Answer? Myth and Possibilities

By Richard Stup, Cornell University. Permission granted to repost, quote, and reprint with author attribution

Beginning on January 1, 2020, farm employees in New York will no longer be exempt from overtime pay. A new law passed by the state will require that farm employers pay overtime (1.5 times the regular rate of pay) to eligible farm employees for hours worked over 60 in a week (except for immediate family members). This requirement will encourage employers to adopt strategies that minimize paying overtime. One strategy that employers are considering is moving employees to salary pay, but the answer is not quite that simple...

**Myth:** “Employees paid on salary don’t have to be paid for overtime, they can work until the job is done.” This is a popular myth but it’s just not true. An employer can choose to pay a farm employee by salary (which means a regular, pre-determined amount of pay not directly based on hours), but the employer may still be required to pay at least the minimum wage, to pay weekly, to keep track of hours worked, and to pay overtime above 60 hours/week. Simply paying by salary has little to do with whether or not overtime pay is required. The need to pay overtime depends on whether or not an employee is “**exempt**” or “**not exempt**” from the overtime law provisions.

Farm employees will no longer be exempt as an entirety, but both New York and federal law identifies several other types of employees who may be employed on farms and may be “exempt” from overtime. The federal [Fair Labor Standards Act \(FLSA\)](#) provides these exemptions for specific types of employees and the federal guidelines are generally followed by New York. The types of exempt employees who might possibly be employed on a farm include: [executive](#), [administrative](#), [professional](#), and outside sales employees. For a farm employee to be classified into one of these overtime “exempt” positions, they **must meet all** of a number of “tests” about the nature of the job.

## Executive

Some farm managers may fit into this description, especially if they are truly supervising two or more other employees.

- The Employee’s primary duty consists of the management of the enterprise.
- The Employee customarily and regularly directs the work of two or more other employees.
- The Employee has the authority to hire or fire other employees.
- The Employee’s suggestions and recommendations as to the hiring, firing, advancement, promotion, or any other change of status of other employees have particular weight.
- The Employee customarily and regularly exercises discretionary powers.
- The Employee is paid on a salary basis, inclusive of board, lodging, and allowances.

## Administrative

Some farm office employees may meet all of these tests, especially if they have specialized training or knowledge and exercise their own discretion.

- The Employee’s primary duty consists of the performance of office or non-manual field work directly related to management policies or general operations.
- The Employee customarily and regularly exercises discretion and independent judgment.
- The Employee regularly and directly assists an employer, or an employee employed in a bona fide executive or administrative capacity or who performs under general supervision, work along specialized or technical lines requiring special training, experience or knowledge.
- The Employee is paid for their services on a salary basis, inclusive of board, lodging, and allowances.

## Professional

This possible category might include highly educated professionals such as a veterinarian who is employed by a farm. For the professional exemption to apply, the job must meet both a primary duty and a nature of the work test.

First, the employee’s **primary duty** consists of the performance of work that:

- Requires knowledge of an advanced type in a field of science or learning customarily acquired by a prolonged course of specialized intellectual instruction and study, as distinguished from: a general academic education, an apprenticeship, or training in the performance of routine mental, manual, or physical processes. -or-
- Is original and creative in a recognized field of artistic endeavor, and produces a result that depends primarily on the invention, imagination, or talent of the employee.

Second, the **employee’s work**:

- Requires the consistent exercise of discretion and judgment in its performance.
- Is predominantly intellectual and varied in character (as opposed to routine mental, manual, mechanical or physical work).
- Is of such a character that the output produced or the result accomplished cannot be standardized in relation to a given period of time.

## Outside Salesperson

Some large or specialized farm businesses may employ an outside salesperson, this position is exempt from overtime if it meets the following definition. “The term outside salesperson means an individual who is customarily and predominantly engaged away from the premises of the employer and not at any fixed site and location for the purpose of: making sales; selling and delivering articles or goods; or obtaining orders or contracts for service or for the use of facilities.”

## Salary Minimum Wage

In addition to the tests required to qualify a job as overtime exempt, salaried positions must also meet [New York’s minimum wage requirements](#) (see page 3 of the linked document for weekly salary for executive and administrative

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## Yield impact on frost-damaged corn grain

University of Wisconsin

Yield losses are negligible if frost occurs when grain moisture is below 35 percent. Yield loss is directly proportional to the stage of maturity and the amount of leaf tissue killed. Those who will be advising growers about the likelihood of frost damage and its impact on yield should get ready by consulting the [National Corn Handbook NCH-1 "Assessing Hail Damage to Corn"](#) (Vorst, 1990). This publication has charts used by the National Crop Insurance Association for assessing yield loss due to defoliation. **Knowing how to recognize frost damage and assess probable loss is important for decision making.** An abbreviated version of the loss chart is shown in Table 7. For example, corn that was defoliated 20% at the milk stage would have 3% yield loss.

Table 7. Estimated percent corn yield loss due to defoliation occurring at various stages of growth.					
Stage of growth	Percent leaf area destroyed				
	20	40	60	80	100
	Yield loss (%)				
Tassel	7	21	42	68	100
Silked	7	20	39	65	97
Blister	5	16	30	50	73
Milk	3	12	24	41	59
Dough	2	8	17	29	41
Dent	0	4	10	17	23
Black layer	0	0	0	0	0

derived from Vorst (1990)

The stem on a corn plant is a temporary storage organ for material that eventually moves into the kernels (Afuakwa and Crookston, 1984). Grain yield will continue to increase about 7 to 20% after a light frost that only kills the leaves as long as the stem is not killed (Table 4).

### Frost damaged grain drying rates

Freezing air temperatures sometimes occur in early autumn before grain is physiologically mature. Grain drying rates can range from 0.83 to 1.16% moisture less/day (Hicks et al., 1976). Drying rates of grain following leaf blade defoliation or moderate to severe cold treatments are not different from the drying rate of normally maturing maize grain. Husk condition does not affect grain drying rates. Defoliation and freezing before physiological maturity (R6) causes grain moisture levels to be 2 to 6 percentage points greater than

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Management Options for Mature & Frosted Corn Silage,  
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Do not be too quick to harvest just because a frost occurred. Frost is less damaging to yield and quality the closer the corn gets to physiological maturity, and frosted plants may continue to mature grain. Leaving frosted corn silage in the field too long risks shatter and loss of leaves, but leaves are only about 15% of the total dry matter yield. If the stalk or any leaves above the ear are still alive, ears continue to convert sugar to starch after frost and advance towards black layer maturity.

To tell if the stalk is still alive, look for green color on the stalk itself, the bases of the leaves, and the husk. Corn whole plant moisture drops by about 0.5 percentage points per day during grain fill and this dry-down rate does not change after frost. Corn is usually near the ideal moisture for silage when kernels reach half milkline, but there is no substitute for actually measuring moisture in a sample of chopped silage using a Koster moisture tester or microwave.

Many delayed planting corn fields have lots of variability in maturity across the field. Be aware of these areas when harvesting and harvest sections separately if possible. If silage must be harvested above desired moisture, adding a source of dry matter as the silo is packed can help improve fermentation. Dry matter sources that include straw, hay or grain. Silage moisture will be reduced by 1% for every 30 pounds of dry matter added per ton of fresh silage. **When corn is immature and kernels are still soft, silage can be chopped more coarsely than usual to help improve ruminally effective fiber, and grain processing is not a critical need.**

Frost can damage corn kernels and anything that damages kernels can allow fungi to get access to the plant. This may increase mold formation and the possibility of mycotoxins, especially if corn stands in the field for a long time before chopping. If corn gets too dry before chopping, mold formation can continue in the silo. If molds and mycotoxins are a concern in a particular field, please [submit a silage sample to MSU](#). Frost and cool weather (daytime highs less than 55-60° F) in general may reduce the number of beneficial lactic acid bacteria on the plants, so applying a commercial lactobacillus inoculant can be good insurance for a vigorous fermentation.

Frosted corn silage may accumulate nitrate if the stalk and some leaf material is still alive. To reduce this risk, cut stubble higher than normal at 18 inches. This reduces yield

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Is Salary Pay the Answer?  
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positions). Weekly salary minimums for upcoming years are:

- For most of upstate: \$885.00 per week on and after December 31, 2019; \$937.50 per week on and after December 31, 2020.
- For Nassau, Suffolk and Westchester counties: \$975.00 per week on and after December 31, 2019; \$1,050.00 per

week on and after December 31, 2020; \$1,125.00 per week on and after December 31, 2021.

The New York State Department of Labor provides a [FAQ document](#) that defines these types of employees in more detail. Farms should make sure that employees they want to classify as "exempt" from overtime have an updated job description and real duties that meet one of the categories above.~



# Discouragement

By Timothy X. Terry, Harvest NY

I had an entirely different article planned for this month. It was written, formatted, and ready to submit, but the subject of discouragement came up in my morning devotional today. (Thank you Dr. Charles Stanley) Given what the industry (you) have been enduring – low farm gate prices, increased government regulation, negative perception by a poorly informed public – I thought it to be a more timely topic. Those of you that have known me for a while know that I can appreciate your situation, at least to some degree. In my career I have been downsized, restructured, budget-cut, and had my position eliminated despite glowing performance reviews. I've also been evaluated using a metric formulated by individuals far removed that has little or nothing to do with my job responsibilities. So, yes, I feel your pain.

*Discouragement is a powerful and destructive force, to be sure. However, understand that despite its power and destruction it is conquerable.*

## What it is

Discouragement is a powerful and destructive force, to be sure. However, understand that...

- it's a choice. Yes, it is often the default response, but you are free to choose another at any time. The sooner, the better.
- it's universal. We live in a fallen world populated by flawed people. Given this, *everyone* will experience periods of discouragement.
- it can recur. Even if we feel we've settled an issue we may encounter a "trigger" that opens up old wounds.
- it can be temporary or lifelong. Again, it's a choice. You can face it head-on and deal with it, or you can let it fester and infect every subsequent decision, action, or relationship.
- despite its power and destruction it is conquerable. Experts point to faith, family, and friends as a three-prong approach to defeating discouragement.

## Diagnosis

A good physician treats the root cause not just the symptoms. To lessen discouragement's paralyzing effects you need to determine its source.

- Unresolved disappointments – our own or someone else's failed expectations.

- Constant criticism – unless there is solid evidence of truth in the comment; learn to let it go. (Corollary: as a manager learn to phrase these comments in a constructive manner)
- Feel no one is listening – often leaves one with a sense of rejection.
- No appreciation for best or >100% efforts – failure to be acknowledged for these over-the-top efforts may feel like a personal rebuff. (Take home: Managers don't be stingy with public acknowledgements and/or attaboy/girl's)
- Bad working conditions – not only the physical facilities but supervisors and co-workers, as well. Remember: one bad apple can spoil the whole barrel.
- Lacking opportunities to shine -- Are you a square peg in a round hole? Are you struggling under tight-fisted management that discourages innovation?

## The Conquest

As mentioned earlier, faith, family, and friends are a three-prong prescription for treating discouragement, but that's only part of it. There are things *you* can do to conquer this malady.

- Look within – Am I part of the problem or part of the solution? Be honest with yourself.
- Admit that you are discouraged – denial doesn't help anyone.
- Identify the root cause – name it and face it (see above). Once you diagnose the specific cause it will likely give you the direction you need to go. Maybe it's reassignment of job duties. Maybe it's retraining (that's how I went from animal scientist to engineer). Maybe it's repurposing existing assets for a new enterprise.
- Recall the nature of the discouragement – disappointments will come and go, but discouragement is a chosen response. You can choose another.
- Spend time meditating on Scripture – this is the faith part.
- Take your discouragement to God in prayer – also the faith part.
- Focus on the opportunity not the situation. This doesn't mean you have to go full on Pollyanna and ignore any present danger, but you can choose to focus on the storm clouds *overhead* or the rainbow *up ahead*.

Discouragement is insidious. Don't underestimate its destructive power. By keeping watch you can avoid its deadly trap.~

## Cornell Cooperative Extension

South Central NY Dairy and Field Crops Program

## Holistic Management Discussion Group <https://scnydfc.cce.cornell.edu/event.php?id=974>

Do you ever feel stuck on a big decision at the farm? Do you wonder if your management choices are leading you in the right direction? If so, join us for a 4-month series where farm managers will:

- ◆ Learn & practice principles of Holistic Management.
- ◆ Articulate a Farm Family Goal that reflects your guiding principles.
- ◆ Learn to use a holistic framework for decision-making.
- ◆ Connect with other farmers in a supportive environment.
- ◆ And more!
- ◆

Sessions run from 11:00am to 2:00pm one Wednesday per month from November to January, at the LaFayette Town Office in LaFayette, NY. Lunch is provided!

### November 13

Getting Started with Holistic Management

### December 11

Developing a Farm Family Goal

### January 8

Making Decisions Using a Holistic Framework

### February 12

Holistic Management in Action

**\*\*Hear from a guest speaker who uses HM on their own farm!\*\***

\$60 per person for the series. Space is limited, so sign up now! Email Shannon at [srm242@cornell.edu](mailto:srm242@cornell.edu) or call 607-391-2662.



## Handling Frost-Damaged Soybeans

**Soybean producers can try these recommendations to reduce adverse effects of an early frost.**

*Author: Michael Staton, Michigan State University Extension, and Kenneth Hellevang, North Dakota State University*



The late planting season has increased the potential for frost damage to occur in soybeans this fall. The following recommendations will help you reduce the adverse impacts if some of your soybean fields are damaged by frost.

Frost-damaged soybeans are generally considered salvageable for grain harvest as long as the plants reached the R6 growth stage at the time the killing frost occurred. The R6 growth stage occurs when the beans completely fill one pod at one of the upper four nodes on the main stem on 50% of the plants in the field. In dense, green soybeans, frost/freezing damage kills the upper leaves but rarely penetrates deeply into the canopy when temperatures remain above 30°F. However, once the upper leaves have been damaged, subsequent freezing events will penetrate deeper into the canopy.

Once the plants reach the R7 growth stage, yield reductions due to frost/freezing injury will be minor. The R7 growth stage occurs when one pod on the main stem has attained its mature color on 50% of the plants in the field.

### Combine adjustment

Frost-damaged beans will probably be wetter than normal and more difficult to thresh. Your first step in adjusting for this condition is to reduce the concave clearance. If acceptable threshing still does not occur, increase the speed of the cylinder/rotor. Make incremental adjustments and check your progress after each adjustment.

### Harvest at higher moisture contents

Soybeans that experienced severe frost/freezing damage extending well into the crop canopy will dry down slowly. In this case, avoid significant harvest delays by harvesting frost-damaged fields at moisture levels between 16% and 18%. Data from the University of Wisconsin showed that shatter losses of 0.2 bushels per acre per day occur after the beans reach 16% to 18% moisture. The beans will need to be dried to a safe moisture level for storage (12% for six months).

Electronic moisture meters will likely be inaccurate and tend to underestimate the moisture levels in green and immature soybeans, so remember to add 1.5 percentage points to the moisture meter readings when testing mixtures of green, immature and mature beans and adjust drying times accordingly. Recheck the moisture content after drying and after a couple days to permit moisture equilibration. In fields where only the upper leaves were damaged by frost, wait and allow the beans to mature and dry to 14% to 15% in the field if possible.

### Drying frost-damaged soybeans with ambient air

If only 2 to 3 percentage points of moisture need to be removed, the air temperature is above 60 degrees Fahrenheit and below 75% relative humidity, no heat is required in drying bins equipped with full perforated floors and fans capable of producing 1 to 2 cubic feet per minute per bushel (cfm/bu).

However, drying will occur slowly. Drying times depend on initial moisture content, air flow, grain depth and weather conditions. Continuously run drying fans when the beans are above 15% moisture and the average humidity of the air is below 70% to 75%.

### Drying frost-damaged soybeans with a high temperature dryer

Be careful if you plan to dry soybeans in a high temperature dryer because soybeans are more fragile than corn and are normally dried using temperatures below 130 F. Seed coat cracking and split beans increase with increasing temperature. For food grade and seed beans, maintain the relative humidity of the drying air above 40% to protect the integrity of the seed coats and prevent splits, but drying will be extremely slow.

The air relative humidity is cut in half for each 20 degrees that the air is warmed, so keeping the relative humidity above 40% limits the drying temperature to about 20 degrees above outside temperature. Control the heat and humidity of the drying air by using short burner cycles or changing the burner jets.

### Store frost-damaged beans

Elevators will discount loads containing green and immature soybeans and, in some cases, may reject entire loads if the damage levels are high. Discounts can be reduced by screening out the small beans, drying the rest to 12% moisture and storing them in aerated bins for a couple months.

*This article was originally published in Michigan Soybean News Fall 2019 Vol. 11 Issue 4.*

### Forage Management Online Course From Field to Quality Feed

**October 25-December 14, 2019**



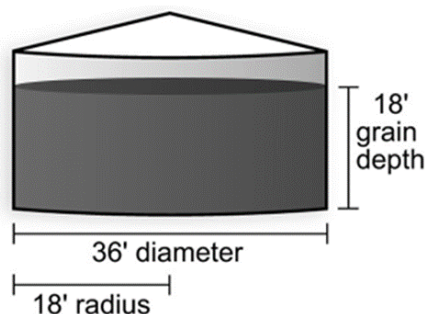
<https://prodairy.cals.cornell.edu/online-courses/forage-management/>



## How to Estimate Bushels of Grain in a Bin

Tom Dorn, Lancaster County Extension Educator, Penn State Extension

With harvest underway or fast approaching, you may be trying to estimate the number of bushels in a partially filled bin and how much capacity is remaining.



### Calculate Grain Bin Capacity

1. Shape
2. Radius (feet)
3. Height (feet)

**Capacity:** 2,512 bushels

### Round Bins

Use the following calculation to estimate the bushels of grain in a round bin.

$$\text{Bushels} = 0.628 \times D^2 \times H$$

Where:

D is the diameter of the bin, in feet.

H is the height of the grain mass in the bin (depth of grain), in feet.

0.628 is a conversion constant.

**Note:** The method described above uses the bin's diameter while the calculator uses the bin's radius (half the length of the diameter).

### Example:

1. Calculate the number of bushels of corn in a 30-foot diameter bin with the eave 18 feet above the concrete foundation with the drying floor, 1 foot above the foundation. This would make the maximum grain depth 17 feet when the bin is full.

In this case, to calculate the bushels of grain contained from drying floor to the eave:

$$\text{Bushels} = 0.628 \times D^2 \times H$$

$$\text{Bushels} = 0.628 \times (30 \times 30) \times 17$$

$$\text{Bushels} = 9,608$$

2. If you have peaked grain at the top of the bin, the bushels in the peak can be estimated by using a different conversion constant in the equation.

$$\text{Bushels} = 0.209 \times D^2 \times H$$

Where:

D is the diameter of the bin, in feet.

H is the height of the grain peak above the eave, in feet.

0.209 is a conversion constant for bushels in a cone-shaped pile of grain that extends to the bin wall.

For example, if the top of the peak is 6 feet above the normal depth of grain in the bin, the volume of the peaked grain is calculated as follows.

$$\text{Bushels} = 0.209 \times D^2 \times H$$

$$\text{Bushels} = 0.209 \times (30 \times 30) \times 6 = 1,128 \text{ bu}$$

Add the totals from example equation 1 and equation 2.

Total grain in the bin is 10,736 bushels (9,608 + 1,128)

### Rectangular, Flat Storage Buildings

For rectangular flat storage buildings, the math is simpler. Multiply length (ft) by width (ft) by grain depth (ft) by 0.8 bushels per cubic foot.

Let's calculate the amount of grain in a flat storage building that is 40 feet by 60 feet and has a grain depth of 10 feet.

$$40 \times 60 \times 10 \times 0.8 = 19,200 \text{ bushels in the bin}$$

*Corn Silage, continued from page 6*

but increases overall forage quality because the lowest part of the corn stalk is wetter and of poor quality (low NDFD). By raising cutting height to 18 inches, forage moisture decreases by 3-4%, forage yield decreases 10-15% but forage quality increases 8-12%, so overall yield (milk per acre) is only reduced by 3-4%."

Harvesting and feeding immature corn immediately as green chop may be a solution for some situations. If feeding as green chop, be very aware of nitrate risk.

Corn can be harvested like other large forage grasses such as forage sorghum. The appeal of this system is that immature, wet corn can be cut and allowed to wilt before being chopped. This system works best with corn prior to flowering and allows producers not interested in grain content, such as grass-fed beef producers, to take advantage of the high vegetative yield potential of corn. Some grass-fed beef producers in Michigan report success with growing corn at high densities (less than 45,000 plants per acre) in 15-inch

rows, cutting with a sickle bar mower before R1, and baling and wrapping using a large round baler with knives.

We evaluated whether immature corn grown at normal population and row spacing could also be windrowed and picked up with a forage chopper after wilting. We tested this idea with R3 corn and discovered that cutting corn with hay equipment is challenging when ears are present. A discbine and a sickle-bar haybine stripped the ears off the stalks and threw them out of the windrow where a forage pickup head would miss them. Best mowing results were obtained with a disk mower with the front guides raised and blades angled up. Mowing at normal hay-cutting height over a rough corn field added a lot of dirt to the forage. Corn stalks did not form a tidy windrow and may be difficult to pick up cleanly with a forage chopper, leading to more dirt in the forage. Dirt in a silo is extremely undesirable because dirt contains clostridial bacteria which may dominate the fermentation. This method will require careful tweaking of equipment settings to be successful and is probably best suited for very immature corn that has not silked yet.~

that of grain from control plants when grain from control plants was in the 22 to 30% harvest range. Grain frozen before R6 required 4 to 9 additional days of field drying to reach the 22 to 30% moisture range. Defoliation and cold treatments have little effect on the drying rates of cobs and ears, but moisture levels are greater than those of the control. Loose husks cause faster cob and ear drying compared to normal husks.

### Characteristics of frost-damaged corn grain (from Hurburgh et al., 2007)

- Small, misshapen, soft kernels
- Undeveloped starch structure; pithy kernels
- Test weights progressively below 52 lb./bu., depending on maturity (in 1993, some corn was less than 40 lb./bu.)
- Average protein (7.5 to 8.0 percent) in corn heavier than 45 lb./bu., lower protein in corn lighter than 45 lb./bu.
- High breakage susceptibility; many fines generated in handling
- Lower digestibility compared with normal corn, especially for test weights below 45 lb./bu. Little or no increase in test weight after drying
- Variable amino acid levels
- Moisture meters generally read low in immature corn.
- Surface drying of kernels, giving deceptively low (by 1 to 2 percent) moisture readings on dried corn

Recognize that these effects are progressive, with least impact on corn closer to maturity.

### Uses for frost-damaged corn

Animal feed is the best use for frost-damaged corn. Low test weight corn used for large animal feed is only slightly less valuable (2 to 5 percent) than normal corn on a per-pound basis. Poultry, however, with limited volumetric capacity, may be more sensitive to frost-damaged corn than larger livestock.

Before feeding, test light corn for protein level, amino acid level, and mycotoxins (especially fumonisin and vomitoxin). Composition will vary. Be aware that fungi invade stressed corn more readily than they do normal corn.

Wet, dry milling, and dry grind ethanol operations will not want frost-damaged corn. Using frost-damaged corn in wet milling causes low starch yields, and the separation of starch and protein cannot be clean. In dry milling, frost damaged corn sharply reduces yields of dry mill grits. Processors will discount light corn more heavily than its reduction in feed value. Fermentation will be more variable in ethanol production, with lower yields and less predictable distillers grain quality.

### Handling and storage of frost damaged grain

Immature and frost-damaged corn will have marginal quality, so it's important to manage equipment carefully to minimize further quality degradation. Set combines carefully, to balance the need to get small kernels with kernel damage. Manage the fines and chaff, which can increase mold problems in storage. Dry grain to uniform moisture levels, a tricky business because harvest moisture

is likely to be somewhat uneven after a cold, short growing season. Dry frost-damaged corn at reduced air temperatures (below 160 °F) and store at 14 percent (or lower) moisture. Dry corn as gently as possible, even if it is tempting to crank it up for higher dryer capacity. Also, use slow cooling methods after gas-fired drying to minimize quality problems. If possible, aerate stored grain to cool it to 20 to 30F for winter storage (in the upper Midwest).

Frost-damaged corn breaks easily and goes out of condition quickly, even at low moisture levels. Expect storage life to be about half as long as that of normal corn. Do not harvest through low-lying frost damaged areas. The mixture will be a high storage risk. Harvest and handle them separately.

Because immature corn kernels dry on the surface, expect the moisture level of stored corn to be higher than test results. Expect to aerate the stored corn frequently. Move immature corn to market before summer. Store only clean corn and pull out the fines-laden center core of grain in bins.

Source: <http://corn.agronomy.wisc.edu/Management/L041.aspx>



Looking for land? Looking for someone to farm your land?

Cornell Cooperative Extensions of Broome, Erie, Essex, Madison & Oneida Counties, the SWNY Dairy, Field Crops & Livestock & Capital Area Ag & Hort teams can help!

Join us for some engaging and informative training sessions this fall and winter! These will be available in-person with guest speakers, facilitated discussions and time for networking.

#### Farmland for a New Generation — Ask the Experts

Join us as we “ask the experts” a question related to finding/listing farmland, marketing that land, creating a lease and setting values for agricultural land!

**Tuesday October 15th, 6:30-8pm** —How to Market My Farmland, Guest Speaker: Jennifer Fimbel, CCE Dutchess County — so you have some land, but aren't using it. Or maybe you want someone to farm it but don't know where to start. During this workshop we will learn different methods for reaching out to both the agricultural and realtor communities to find someone interested in utilizing your land.

**Tuesday October 29th, 6:30-8pm** —Where do I find farmland & can I afford it? Guest Speakers: Michael Parker (National Young Farmer Coalition) & Alex Morency (American Farmland Trust-NY) We'll learn about the Finding Farmland Calculator designed by the National Young Farmer Coalition & the NYFarmlandFinder designed by American Farmland Trust-NY, learn how to use them together to find farmland and gain the information necessary when approaching a lender.

**Tuesday November 12th, 6:30-8pm** — Understanding Appropriate Agricultural Land Uses and Setting Realistic Land Values, Guest Speaker: Nicole Tommell (CNY Dairy, Field Crops & Livestock team) — whether you are a landowner, or looking for farmland, understanding the best/most appropriate land uses, as well as it's value are paramount to getting started on the right foot. Join us as we learn how to set realistic land values and understand how to evaluate land for appropriate farm uses.

**Tuesday November 26th, 6:30-8pm** — Leasing, Guest Speaker: Jerry Cosgrove, Of Counsel at Sclaro Fetter Grizanti & McGough, P.C. — Whether you are pursuing an agricultural assessment, or are looking to formalize an agreement for agricultural land use, leases are one potential tool. They do not need to be complicated, but should include several key features which outline roles, expectations, and terms, just to name a few. Join us as we learn how to properly put together a farmland lease that protects both parties.

The cost to attend is just \$10/farm or household per session and includes 2 registrations. If you would like to attend all 4, the package cost is \$30. These will take place at the CCE Broome County Agricultural Development Center. To register click: [https://events.cornell.edu/event/ask\\_the\\_experts\\_workshop](https://events.cornell.edu/event/ask_the_experts_workshop)

For more information or questions, please contact:

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Cornell Cooperative Extension  
Broome County

# Biennial Requirement to Update DOT Numbers

-Janice Degni



There have been a number of DOT check stops where farm trucks and trailers get spot inspected for safety features. One item that is easy to get cited for is not having renewed your DOT number. The FMCSA website states, **“Failure to complete a Biennial Update will result in deactivation of your USDOT number and may result in civil penalties of up to \$1,000 per day, not to exceed \$10,000.”**

There is no charge for the initial DOT number and there is no charge for updating. There are companies that offer to update your numbers for a fee. I have heard they can charge from \$150-\$350. Beware of such offers they are a scam. If you have mistakenly used such a service with a credit card, contact your credit card company and report it as fraud. It is fairly painless to renew on line at the Federal Motor Carrier Safety Administration (FMCSA) at <https://www.fmcsa.dot.gov/registration/updating-your-registration>.

If the next-to-last digit of your USDOT Number is odd, you shall file its update in every odd-numbered calendar year if it's an even number, in every even-numbered calendar year. Get in a routine and establish a reminder system for yourself. You don't want to risk an expensive, unnecessary fine. For additional details see the table on line.

You can update on-line. You must have a pin number or a cell number on file so that you can receive a pin number via text. Updating can be done in less than 15 minutes once you are at the website. If you need assistance, contact Janice to walk you through the process.~

## Three Approaches to Fair Farmland Rental Rates Continued from page 4

negotiating a fair rental value. Yet there are many other terms to consider in a lease agreement, some of which may influence the price:

- How long will the lease last?
- Who will be responsible for major repairs?
- Can the tenant make improvements to the property? If so, who will pay for the improvements, and who will own the improvements when the lease ends?

It takes time to consider all of the questions that go into developing a sound lease agreement. Having a written agreement is important to protect the interests of both parties. Yet the best rental agreements always seem to emerge when property owners and tenants develop a relationship based on mutual respect and a shared set of values. Taking time to identify and articulate your own goals is a good starting point to help you find a good rental arrangement.~



## FARMER MICROGRANTS

American Farmland Trust is offering *Farmer Microgrants* to support farmers in hiring professional advisor services to secure access to farmland, develop or implement farmland transfer plans or conserve farms for agricultural use.

Grants are available for up to \$2,500 per project. A project may involve an individual farmer, a farm family or a group of farmers with a cooperative business.

Grants can only be used by farmers to hire professional advisor services relating to their farmland access, transfer or conservation needs. Eligible activities may include but are not limited to:

- ⇒ Hiring an attorney to develop a farm lease agreement.
- ⇒ Hiring a financial or estate planner to assist with a farm transfer plan.
- ⇒ Paying transaction costs associated with purchasing a farm or developing an agricultural conservation easement.

Applications will be accepted on a rolling basis until available funds are expended. All services supported by the grant must be completed by December 31, 2019. Contact Tim Biello at (518) 581-0078 x 305 or [tbiello@farmland.org](mailto:tbiello@farmland.org) with questions or to request an application.





# Cornell Cooperative Extension

## South Central NY Dairy and Field Crops Program

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### CALENDAR OF EVENTS

Oct 15+	Farmland for a New Generation. <i>Looking for Land or Someone to farm your land?</i> -Multiple Dates For more information, see page 10	6:30-8:00 pm
Nov 12	Automated Milking Systems Discussion Group, Farm Credit East, Homer For more information contact Betsy Hicks, (607) 391-2673 or <a href="mailto:bjh246@cornell.edu">bjh246@cornell.edu</a>	5:30-8:30 pm
Nov 13 +	Holistic Management Discussion Group—Multiple Dates For more information, see page 3 and visit: <a href="https://scnydfc.cce.cornell.edu/event.php?id=974">https://scnydfc.cce.cornell.edu/event.php?id=974</a>	11 am—2 pm
Dec 3	Cow Comfort in Freestalls, Preble Hill Dairy, registration 9:30pm, Classroom & On-farm For more information contact Betsy Hicks, (607) 391-2673 or <a href="mailto:bjh246@cornell.edu">bjh246@cornell.edu</a>	10-3 pm
Dec 8-12 Feb 23-27	Dairy Executive Program, Class 14 - The Statler Hotel, Cornell University, Ithaca, NY To learn more: <a href="https://prodairy.cals.cornell.edu/conferences/dairy-executive-program/">https://prodairy.cals.cornell.edu/conferences/dairy-executive-program/</a>	
Dec 5	Cornell Field Crop Dealer Meeting—Doubletree Hotel, Syracuse, 6301 State Route 98 Held at the NE Agribusiness & Certified Crop Adviser Conference. Topics: Update on Soils & Yield Potential Database, Benefits of Entomopathic nematodes, Field Crop Disease and Management Update, CBD Hemp-Opportunities and Challenges, Herbicide Resistance in Tall Waterhemp and Marestalk Populations in NYS	8-12 pm
Dec 10	Feed Dealers Seminar - location in Cortland TBD Drs. Overton and Reed, Cornell University	6-9 pm
Dec 13	Cow Comfort in Tiestalls – location TBD, registration 9:30 pm, Classroom & On-farm For more information contact Betsy Hicks, (607) 391-2673 or <a href="mailto:bjh246@cornell.edu">bjh246@cornell.edu</a>	10-3 pm