

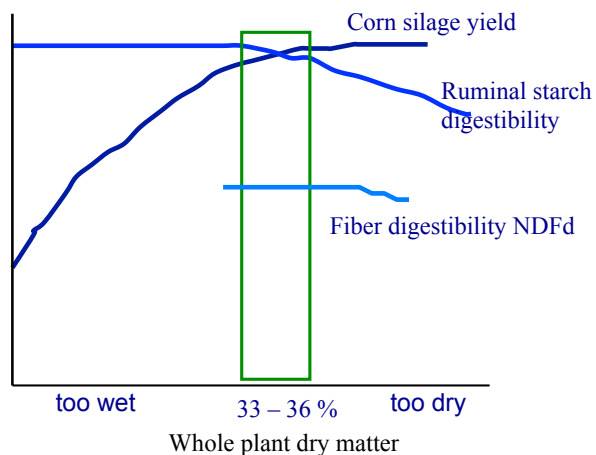
## Corn Silage Harvest Considerations

Hopefully the chopper has been carefully gone over, the bunker has been repaired, the trucks and packing tractors and operators lined up and coordinated, and the plastic purchased. Now here is to clear skies and dry fields. Here are some questions pertaining to corn silage harvest that we have discussed recently:

**When should I start chopping?** Ideally corn would be chopped when it was approximately 33-36% dry matter. It is usually about ½ milk line at this time, but crop dry matter trumps kernel milk line in naturally maturing corn; it may differ with corn relying on irrigation to maintain its dry matter and life. Starch is accumulating as the crop matures. This increases both the yield and energy level of the corn silage, and it's why we want to wait to let corn mature to at least 33% DM. Chopping earlier than this lowers yield and corn silage energy levels, and increases effluent. As the crop matures and becomes drier, the kernel starch becomes more crystalline in structure and lower in ruminal degradability. The stover also starts to become spongier and more difficult to pack. Additionally, if the weather turns warm and breezy, then the fields can quickly become too dry. The digestibility of NDF remains steady throughout these DM ranges. For all of these reasons, we recommend a harvest DM of about 33-36% DM for conventional corn silage.

Harvest DM recommendations for brown midrib corn silage are very similar. Ideally, it would be harvested at an even tighter range, such as 34-35% DM. The reasons for this are that BMR is more likely to juice, or have effluent flowage, even with DM in the 32-33% range. Unlike conventional corn silage varieties, BMR NDF digestibility has decreased at higher dry matter levels. Also, the starch in BMR corn silage is often more organized and crystalline, further decreasing its ruminal fermentability at higher DM levels.

Harvest Considerations with Corn Silage



**How tightly should the rollers be set on the crop processor?** The correct answer is that it depends! Generally we will see roller width set at 2 to 2.5 mm and then turned down as the unit wears and according to crop conditions and chop length. Monitor as discussed below and adjust accordingly. Keep in mind the following principles. The amount of starch that is fermented in the rumen increases as the pieces of the broken kernel get smaller, as crop DM decreases (wetter corn silage), and as the amount of time that the feed will be stored in the silo increases. The goal is to have all kernels well-broken. Make the kernel particle size as small as you can if the corn silage is going to be fed within a couple of months of ensiling, especially if it is dry. It is less important to have all kernels broken into small pieces if the corn silage is 32-34% DM, the kernels are normal texture, and is going to sit in the silo for at least six months before ensiling.

**What is the Corn Silage Processing Score (CSPS)?** The CSPS is simply the proportion of starch in a sample of your corn silage that passes through a 4.76 mm screen. It correlates with ruminal starch digestibility since large particles of starch (i.e. > 4.76 mm) are less likely to be fermented in the rumen than small particles of starch (< 4.76 mm). It is a great first step forward, but it is only based on particle size. Thus, a corn silage sample that is 40% DM with one month of ensiling time could score the same on a starch particle size basis (the CSPS) as a sample that is 33% DM and sat in the silo for 10 months. However, the ruminal starch dynamics of these two silage samples would be entirely different. Additionally, some crop processors may rip the kernel apart, yet large amounts of starch will still be adherent to the pericarp. These particles may test as being greater than 4.76 mm (low ruminal degradability according to the CSPS), yet they would be very highly ruminally digestible.

**How can I evaluate the degree of kernel processing during harvest?** You can send in samples for CSPS, but the procedure will take a few days. Additionally, the CSPS increases by several points simply from going through the fermentation process. A quick and simple field test (the Pioneer corn silage processing monitoring system) can be used to evaluate processing in the field. Simply fill up a 32 ounce container with freshly chopped corn silage and dump it into a bucket of water. Swish around the sample, allowing the dense corn particles to sink and the less dense forage and cob to float. Dump off and discard the water and floating material, and then pour out the remaining corn pieces onto a clean surface. There should not be more than 2-3 kernels that are unbroken, with the vast majority of kernels ripped open or cracked into multiple pieces.

**Should we use an inoculant?** Yes, but make sure it has been proven with sound research (not testimonials), and handled properly by the supplier and your crew. We would also be careful how much was spent on an inoculant; you don't need to spend a fortune to have a quality inoculant. The goal with essentially all inoculants is to help shift the initial fermentation occurring in the silo to a more efficient, desirable fermentation. You may also want to purchase an inoculant that also has stabilizing, anti-yeast and anti-mold

properties. These inoculants generally contain a strain of *L. buchneri* bacteria. This bacteria grows slowly in the silage over time, converting a portion of the lactic acid to acetate and 1,2-propanediol. These fermentation compounds reduce the growth of yeast and mold organisms, improving the “shelf life” of silage in the bunker and in the barn.

**How long should it be chopped?** Usually a ¾” TLC is appropriate – it should not be chopped longer than this. The chop length should be shortened with drier corn silage since it chops longer and is more difficult to pack. The settings could also be tweaked up or down based on expected digestibility, with high digestibility forages (e.g. BMR) hybrids being chopped longer than forages where we expect fiber digestibility to be lower – hopefully there aren’t many feeds like this going into the bunker designated for lactating cows. Knives need to be kept sharp and shear bars set appropriately to minimize the amount of longer, straggly strands of stalk and husk that can be sorted out by the cows. Guidelines for the Penn State Particle Separator are approximately 5-20% on the top screen, 45-70% on the middle screen, and 20-30% on the bottom screen.

Here is a final thought on chop length...through the TMR Audits™ routinely done by Diamond V, we see a lot of TMRs with low single digits on the top screen (2 – 6%), but plenty of material on the middle screen (50- 60%), with very good rumination, cow health, and milk components. This has made us question the rumination value of particles retained on the top screen. Additionally, these particles are also easier for the cow sort out, especially if they are longer than ~ 2”. Recently the Miner Institute presented research data evaluating the effects of particle length on eating and rumination time. They found that longer chopped forages increased eating time, but had no effect on rumination. Extended eating times could be a problem if the feedbunk is overcrowded or cow time budgets are already tight. The TMR of the lactating cows at the Miner Institute has less than 5% of the TMR retained on the top screen, with the cows typically averaging close to 100 pounds of milk with milk fat levels close to 4.0%.

**How high should I chop it?** This is also an “it depends” answer. High chopping removes the lower, least digestible portion of the stover, and consequently increases the relative amount of grain in the silage. High chopping slightly decreases the NDF level of the silage, marginally increases NDF digestibility, and allows for a bit more forage to be fed. Consider high chopping (12-18” stubble height) if yields are heavy and the dairy will have plenty of forage to feed. Always chop BMR as low as you can. High chopping will also result in drier corn silage since the lower stalk is wetter. Thus, you won’t want to high chop if the crop is becoming too dry.