

A message from Kevin Putnam, Dairy Specialist with Dupont-Pioneer

Everyone,

Over the last couple of weeks I have been asked multiple times, what will 2017 corn silage quality be like given the rain we have had so far, and is there anything we can do about it? The answer, as always, it depends. The reason it depends is mainly due to three factors, pollination, current inventory, and progress of the current crop. All of which are variable given drought conditions in areas last year, and delayed planting for many this year. In this email I hope to explain what corn silage quality could potentially be, and what management strategies could be utilized to improve it.

What is the potential NDFd of 2017 corn silage?

If we are only considering the fiber portion, which we would be with NDFd, then we have the potential to be disappointed. Corn silage NDFd is determined pre-silk, this is when the plant is building structure in the form of fiber, lignin, and cross linking (rebar that ties it all together). Once the plant goes reproductive its main focus is its offspring, the ear, this is why we typically see little to no plant growth after pollination. The main factors that affect corn silage fiber digestibility are moisture, sunlight, and heat (in that order). Dr. Mike VanAmburgh has said that moisture has a 7x greater the effect on NDFd when compared to sunlight and heat. Even though we have a lot of corn at different growing stages around the countryside right now, it's pretty safe to say that most of the pre-silk growth has come during wet conditions. Not that I have to remind anyone, but this comes after one the worst droughts on record in 2016, and with that record high NDFd levels. So we are looking at potentially having 2017 corn silage be a complete 180 from 2016, from an NDFd standpoint.

What can we do about it?

The new saving grace is the adaptation of nutritionists balancing rations using uNDF. The simplest explanation of uNDF is that it is the undigestible portion of fiber, and directly effects gut fill, passage rate, and dry matter intake. With the increased fiber, lignin, and cross-linking expected in this year's crop, we would expect to see higher uNDF numbers in 2017 compared to 2016. We would also expect a skewed ratio of slow pool fiber digestion vs. fast pool, due to the cross linking binding the cell wall together more tightly.

How can we manipulate this number? With higher levels of starch in corn silage. When balancing a ration the concern the is total lbs. of uNDF being delivered to the cow, so if we can decrease the percentage of uNDF on a dry matter basis in corn silage, we can still feed high levels of corn silage. Now, there is much more that goes into this. Like mentioned earlier, if the ratio of the fast and slow pools of fiber digestion change like we would expect, that would have an effect. The other consideration is that we would be adding more digestible starch source to the ration through corn silage, which would have to be monitored.

What are some ways can manipulate starch percentage in corn silage? High chop and corn silage maturity at harvest. Which goes back to my point earlier about inventory and progress of the current crop.

High Chopping – I'll start by saying, if inventory is an issue, you have to consider that with every 4 inches of increased cutting height, you can expect yields to be reduced by 1 wet ton of silage per acre. High chopping can also increase NDFd, however, in multiple Pioneer research trials the increase in NDFd was variable and dependent on growing conditions and hybrid. In six separate trials conducted between 2000-2005, the increased NDFd ranged from 0.5 – 5 points, these trials included BMR and traditional silage. High chopping will always increase starch percentage, and as the graph shows below, if you can increase starch that will dilute out uNDF.

This graph using internal Pioneer plot data shows the relationship of uNDF by starch %, with a starch range of 26 – 47. You can see, as starch goes up (left to right), uNDF %DM goes down.

Harvest Maturity

This will depend on current crop progress, plant health (leaf disease), and when harvest occurs. As the ear matures and milk line drops, it continues to lay down starch until the kernels reach physiological maturity, otherwise known as black layer. A rule of thumb we have used at Pioneer is, for every point of dry matter increase as the crop matures it is equal to just under 1 more point of starch, and therefore 1% more yield (see graph below).

As with many things we tend to come full circle, in the past we have chopped corn silage based on milk line, then moved to dry matter, and now we are considering a combination of the two, with milk line being the prominent driver. The reason for this is due to milk line being the true driver of kernel maturity, leading to higher starch and yield later in the year. Dry matter was used because it tended to be an easier gauge for measuring, especially with sensors on choppers, and is a huge component of packing and fermentation. The reason we are now looking at a combination is because the relationship between milk line and dry matter is not linear, this is due to hybrid differences in genetics, plant height, late season health, grain to stalk ratio, etc.. For example, if you have two hybrids, one taller hybrid at $\frac{3}{4}$ milk line, and one shorter hybrid at $\frac{1}{2}$ milk line, the taller hybrid due to the green portion may be lower in dry matter, but the shorter hybrid has more to gain by being chopped later. Where does dry matter come into play? If you look at the data below starch continues to climb up to 45% dry matter, at some point we need to have a dry matter cut off so packing density and fermentation are not compromised.

So how does this fit? Like discussed with high chop, the more starch we have, the more we can dilute out uNDF. For this year we have many acres that will be harvested later than desired, so this year may not be the best year to fully utilize this management practice. However, there will be situations where crops will be maturing at much different time points due to a large planting window, so there may be an opportunity with corn ready to harvest during the first harvest window.

This graph using internal Pioneer plot data shows the relationship of starch % by dry matter, with a dry matter range of 28-45. You can see, as dry matter goes up, starch goes up (until blacklayer).

Pioneer Nutrivail Fiber Technology Inoculants

I have tried to send out emails like this in the past, and with them I have mentioned that these are not meant for sales purposes, but hopefully management information that helps your operations. With that said, I will mention that Pioneer's Fiber Technology Inoculant for corn silage is 11CFT, and could help unlock some of the digestible fiber in the corn silage cell wall. The inoculant includes up front homofermentative (lactic acid) and back end heterofermentative (L. Buchneri) bacteria, the L. Buchneri bug creating an enzyme that breaks down some of the cross linking bonds. If you would like anymore information on this, let myself or your local Pioneer representative know.

If you have any question or comments, please feel free to contact myself or your local Pioneer Representative.

Thank you,
Kevin Putnam
Dairy Specialist NY/NE
DuPont Pioneer – CU11
Email – kevin.putnam@pioneer.com
Cell # - 585-245-1239