Was Corn Silage Fiber Digestibility 'Down' in 2015?

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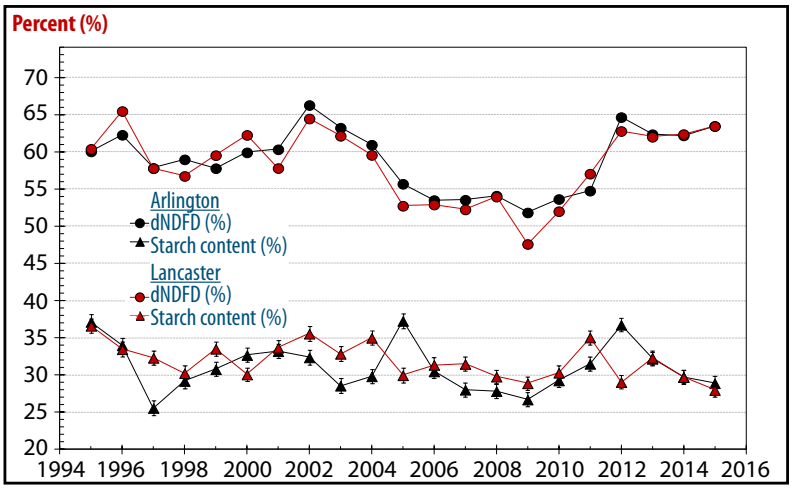
There are two significant energy pools in corn silage. Grain provides the bulk of energy, while stover (stalk, leaves, shank, and cob) provides a smaller but still significant amount of energy. Grain and stover energy pools each comprise roughly 50% of dry matter in corn silage. However, grain is 80-98% digestible, while stover is only 40-70% digestible by dairy cows.

Last year, researchers, consultants, and farmers observed corn silage fiber digestibility was 'down.' Speculation was leaf diseases (e.g., Northern corn leaf blight) might be the reason. Numerous other factors which can influence fiber digestibility of corn silage include hybrid selection, maturity, cutting height, and quality of fermentation.

Figure 1. Cell wall digestibility (dNDFD) and starch content of corn grown in the UW Silage Trial at Arlington and Lancaster, WI (N= 7719). Bars are standard errors.



I was curious about the environmental range of corn silage fiber digestibility as measured by dNDFD. I used data derived from the University of Wisconsin corn silage evaluation program during 1995-2015 from Arlington and Lancaster, WI (N= 7,719 observations). The same set of hybrids were grown at each location each year, but differed between years. Results of the analysis are shown in Figure 1.

For both dNDFD and starch, there was a significant Location x Year interaction, however, year had much more of an effect on these measures than location. Significant location differences were measured for dNDFD and starch. At Lancaster, dNDFD averaged 58.4%, while dNDFD at Arlington was greater at 58.9%. Starch content at Lancaster averaged 31.9% while starch content at Arlington was lower at 31.1%.

Across years, dNDFD ranged from a low of 48% at Lancaster in 2009 to a high of 66% at Arlington in 2002. Starch content ranged from a low of 26% at Arlington during 1997 to a high of 37% at Arlington during 1995 and 2005. Harvest maturity (as measured by forage moisture) seems to more likely correlate with dNDFD changes. There was a period from 2005-2011 when dNDFD was lower compared to other years and was likely caused by earlier harvest at greater forage moisture.

Record USDA corn grain yield years in Wisconsin were 2015, 2010, 2009, 2005, and 1999. The five worst years deviating from trendline were 2012, 2008, 2007, 2003, and 2001. No obvious correlations with 'good' or 'bad' years were observed. Significant early season droughts occurred during 2005 and 2012, however, timely rains came around pollination, eventually producing high grain yield on short plants. Cool seasons like 2009 or earlier harvests like the period between 2005-2011 seem to lower dNDFD. Within a year when the same set of hybrids were grown at Arlington and Lancaster, there was not much difference between locations for dNDFD. Greater differences between locations were more often observed for starch content.

It has been suggested a 'scissor-clip' approach similar to the one used for alfalfa might be appropriate to maximize the corn silage stover energy pool (dNDFD) and improve timing of harvest. More work needs to be done to understand environmental and biological effects on dNDFD changes in corn silage. We need to remember energy from grain is a much larger energy pool than energy from stover, and corn silage should be managed with grain production as a priority.