Rationale for the Project

Where there are cattle, there is corn silage. When we talk about corn silage in Wisconsin, we are talking about a very serious topic. Statewide over 850,000 acres of corn are ensiled as silage each year. The fact that we harvest more corn silage than any other state in the nation…nearly 15 million tons annually suggests that while alfalfa may be known as the “Queen” of the forages, it is probably safe to proclaim corn silage is indeed “King” for many of our dairy operations.

As recently as 2010, corn silage was being bought and sold for approximately $45 per wet ton; however, the economics of forage have changed dramatically in the two years since. In August of 2011, prices as high as $78-$80 per wet ton were verified. The drought during 2012 kept prices in the $80 area all summer long reinforcing the importance of corn silage to any dairy operation’s bottom line. These economics make corn silage a very valuable commodity heading into the 2013 growing season, suggesting farmers are going to be looking for ways to increase their yields and efficiency.

Twin row corn planters place seed 8-inches off center of the traditional 30-inch rows. Ideally, the planter is also staggering the placement of the seed to maximize growing area and provide for a more uniform spacing between individual plants. In turn, this should provide a larger area for the roots to develop as the corn plant emerges due to greater total distance between corn plants (as seen below). While there had been a lot of research conducted in neighboring states when it came to twin row corn production for grain, the question remained whether or not this type of row spacing would result in any substantial increase in corn silage yield or quality.
Evaluating the Results from 2011 and 2012

In 2011 and 2012 the Midwest Forage Association (MFA) helped fund a local forage research proposal in partnership with the Outagamie County Forage Council that evaluated twin rows versus single rows in an effort to determine if there were indeed yield or quality differences in corn silage grown in twin rows as opposed to single rows. Four farms hosted twin row corn silage research plots in 2011, with three sites being harvested successfully. In 2012, two farms participated; however, due to the impacts of the drought, we were only able to collect data from one location. In this project we not only were comparing single rows to twin rows, but, we also tried to answer the question that all producers often ask – “What population should I be planting my corn at?”

The trial examined 30,000; 35,000; and 40,000 planting populations in both twin rows and single rows in 2011 and 2012. Plots were harvested, weighed, and samples collected for each replication. Dry matter (DM) yields were determined and Milk per Ton (MPT) values calculated using Neutral Detergent Fiber Digestibility (NDFd). The results were interesting and illustrate the importance of multiple replications and multiple sites over multiple years (and growing conditions). In 2011, the single rows averaged 6.2 tons/DM silage per acre, while the twin rows averaged 6.3 tons/DM, an increase, but not statistically significant. In terms of Milk per Ton (MPT), the singles averaged 2,764 lbs. MPT while the twins averaged 2,779 lbs. MPT, an increase, but not statistically significant. Lastly, when it came to Milk per Acre (MPA), the singles averaged 17,108 lbs. MPA while the twins averaged 17,638 lbs. MPA, once again, an increase, but not statistically significant.

In 2012, the single rows averaged 5.9 tons/DM silage per acre, while the twin rows averaged 5.9 tons/DM. In terms of Milk per Ton (MPT), the singles averaged 3,104 lbs. MPT while the twins averaged 3,081 lbs. MPT. Lastly, when it came to Milk per Acre (MPA), the singles averaged 18,164 lbs. MPA while the twins averaged 18,119 lbs. MPA.

While we were not able to demonstrate a statistical difference between twin rows and single rows when simply evaluating Row Spacing (RS), we were able to confirm data from existing studies on Plant Density (PD). In this particular study, the lower your PD, the higher the observed Milk Per Ton (MPT). MPT is the quality measurement accounting for NDFd. Using the mean MPT’s for each PD across the sites in 2011, 30,000 (both twin and single) yielded the highest average MPT (2,884 lbs. milk/T), followed by 35,000 (2,745 lbs. milk/T) and then lastly 40,000 (2,686 lbs. milk/T). The 30,000 PD was statistically higher than both the 35,000 and 40,000 PD’s when it came to overall total MPT over the three sites in 2011. PD MPT numbers for 2012 were slightly different than 2011, but still demonstrated that when it comes to quality, 30,000 and 35,000 planting populations produced higher MPT than 40,000 planting populations, 3,076 lbs. MPT (30,000) and 3,145 lbs. MPT (35,000) vs. 3,055 lbs. MPT (40,000) respectively.

At the end of the day, what conclusion could we draw from this effort? In this particular study, RS had little effect on corn silage yield and quality. PD is a major factor in corn silage yield and quality, suggesting producers consider the yield and quality trade-off between MPT and Milk per Acre (MPA). MPA is Dry Matter (DM) yield multiplied by MPT. Producers always want higher yields, but need to consider what quality they might lose (MPT) at those ultra-high planting populations. Last, but not least, in this particular study, when both PD X RS interactions were evaluated together instead of independently, few forage yield and quality measurements were detected when the two characteristics (RS and PD) were combined.

It should be noted that studies conducted by other companies/institutions have shown different results. However, the more extensive my literature review became when searching out additional sites, the more I found myself corroborating a conclusion reached by Dr. Joe Lauer, UW-Madison/UW-Extension Corn Agronomist back in 2007. In an interview, Dr. Lauer stated that his observations were that “half the time 30-inch rows will beat narrow or twin rows and the other half of the time twin or narrow rows will beat 30-inch rows”. After looking at this effort over multiple sites, over multiple years, I would tend to agree with him.
If there was a way to sum up the observations of this particular study of twin rows based on the research conducted in East Central Wisconsin, it would maybe be best put this way… the use of twin rows was not observed to have a substantial impact on corn silage yield or quality, while there were individual replications where increases were observed, when multiple treatments and multiple locations were combined, consistent, statistically significant results demonstrating an increase in either silage yield or silage quality were not observed. It is important to note that planting corn silage in twin rows does not negatively impact silage yields or quality; we simply did not observe some of the double digit differences in East Central Wisconsin that have been cited in studies that have been conducted in other locations across the United States.

For more information about this Midwest Forage Association Twin Row Corn Silage Research project, visit http://outagamie.uwex.edu/.

Additional Notes

This research information was shared at two MFA Affiliates in February, 2013. First at the Chippewa Valley Forage Council Seminar & Annual Meeting and then the Central Wisconsin Forage Council (CWC) Educational & Annual Meeting. A full evaluation of the participants knowledge of the impact of Row Spacing (RS) and Plant Density (PD) was given measuring attendees knowledge before the presentation, and then following. Participants identified a significant increase in their understanding of the impact that RS and PD have on overall corn silage yield and quality. More importantly, CWC Advisor, and Clark County Crops & Soils Agent, Richard Halopka followed up by indicating that “Kevin’s topic brought people in after the corn planter meeting in Longwood. One farmer commented that he was told he had to order the planter today for twin rows, after hearing Kevin’s presentation he thought he would consider a conventional planter or just continue using his. We had 29 people attend this year the best attendance since I’ve been in the county.” – Richard Halopka, 2-6-13 email communication to all speakers on the CWC Educational & Annual Meeting agenda.

Budget Notes

In 2011, I underestimated the costs of testing samples by more than $500 (actually testing was in excess of $2,600) and the Outagamie County Forage Council picked up the difference between our MFRP allocation and the balance. In 2012, due to the fact that we had fewer sites harvested and a slightly lower cost per sample for testing, the total cost for testing came in at $1,808.40. As a result, we had approximately the same amount we were short in 2011, as a surplus in 2012 (approximately $500). Over the two years, it has been basically a zero balance…what has been allocated for testing for this particular project over the two years of 2011 and 2012 has been spent on that identified expense.

Final Thoughts

Due to the fact that I served as the Executive Secretary for Wisconsin Farm Technology Days 2012 in Outagamie County, I was not able to give this effort the same amount of time and attention as I did the year before. Unfortunately, that resulted in fewer sites, and fewer sites harvested. While we only had one twin row site harvested, as a part of the 2012 effort we did harvest a site where we evaluated 15” vs. 30” rows using an interplant corn planter. Three hybrids were used, Pioneer, Dairyland, and a Mycogen BMR. All three hybrids were 105 relative maturities. BMR corn was compared at this site to non-BMR hybrids corn and what we found was that the BMR was generally 2-3% wetter than the non-BMR hybrids. The highest MPA over all replications was from the Mycogen BMR (26,798 lbs. of milk per acre at 35,000 in 15” rows). Pioneer finished in second with 26,231 lbs. of milk per acre at 35,000 in 30” rows, followed by Dairyland in third at 24,703 at 35,000 in 30’ rows. I have stressed to those I have shared these results with that due to the fact that we only have one site in one year (a severe drought one at that) of this planting comparison, they need to take that into consideration when evaluating the results for their own purposes.