
Corn Silage Hybrids...*picking the winners so you won't be a loser*

As little as 10 years ago, corn silage hybrids were selected on the premise that a top performing grain hybrid equated to a top silage hybrid. At that time there was precious little corn silage performance data available and many producers didn't know how the crop would be harvested until growing season's end. Today, corn hybrids are routinely tested for silage characteristics (both yield and quality) by the public and private sectors and many dairy producers plant corn for the sole purpose of harvesting a silage crop. All of this has led to more emphasis being placed on corn silage hybrid development and selection. It has also led to a vast array of opinions on how selections need to be made.

Corn silage hybrid selection basics

Before beginning, there are some points that need to be known. This will make the whole process easier. These points are:

- Prepare to be frustrated, especially if you listen or talk to more than one seed company representative or university employee.
- Making a decision on 1-year, 1-location data is like getting married after the first date. Likely, you'll make a wrong decision. Think of locations as environments rather than locations and analyze data from a lot of environments.
- Prepare to encounter yield x quality tradeoffs. No hybrid to date has been #1 in both categories but some are well above average on both counts.
- Significant differences exist for both yield and quality among corn hybrids. The key is to locate and capitalize on these differences!
- Predicting corn silage quality factors not related to harvest time whole plant moisture or cutting height starts and ends with hybrid selection.

How are companies attempting to improve corn silage hybrid performance?

The laundry list of traits that must be taken into account when selecting a corn silage hybrid is growing larger with each passing year as new characteristics are identified or old traits are more accurately measured. Traits currently available to ruminant over are as follows:

Agronomic Traits

- Total yield
- Grain yield
- Maturity
- Standability
- Disease resistance
- Insect resistance
- Herbicide resistance
- Drydown rate
- Staygreen

Feed Quality Traits

- Crude protein
- NDF
- NDF digestibility
- *In vitro* digestibility
- Starch Content Availability
- Kernel texture
- Milk/ton

-----Milk/Acre-----

Corn breeders have attempted to improve corn silage quality at several different fronts. These are:

1. Improve digestibility of the forage "pool"
Inserting the brown mid-rib (bmr) mutant is the extreme example. Currently, no normal corn hybrids can match bmr hybrids for forage (NDF) digestibility. However, plant breeders have been successful selecting for silage hybrids that are consistently above average for forage digestibility but don't have the bmr trait.
2. Improved kernel texture for higher starch availability
3. Maintaining a large "yellow" energy pool
Increased grain yield is still an effective method to maintain high whole plant energy levels.
4. Some combination of the above
Combining all of the above along with high yield will likely result in the best corn silage hybrids of the future.

It's significant to note that simply putting more leaves on a corn plant does not necessarily lead to improved quality and may actually be detrimental.

Which would you pick?

Given the following data from the 2002 UW Corn Silage Performance trials, which one or two hybrids would you select? I posed this question to a number of agronomists, feed consultants, and farmers on an Internet silage list-serve to see how the industry valued different traits. Below are the data and some responses:

Hybrid	D.M. Yield	NDFD %	Starch %	Milk/Ton	Milk/Acre
A	9.5	59	23	3250	30800
B	9.3	61	37	3360	31400
C	9.4	56	34	3190	30300
D	6.6	68	31	3720	24500
E	9.7	65	34	3560	34500
F	10.1	62	35	3480	35400
G	10.7	62	27	3380	36100
Trial Avg	8.9	61	33	3600	32000

Some responses:

- “I would choose hybrid E.”
- “I would select G because of highest value of milk/acre.”
- “I’d go with E and F, which combine yield and quality.”
- “I would choose hybrid F....but given the right circumstances you could make a case for D.”
- “F solely for milking cows....G for replacements.”
- “If the goal is to have the highest milk production possible at any cost, the choice is D.”
- “If A and C were dairy bulls, their throats would be cut at a young age.”

Most voters chose hybrids E or F, two hybrids that were not the “top” hybrid in any of the categories. It all comes down to trade-offs.

The corn silage hybrid selection game is one of trade-offs. This includes trade-offs between yield and feed quality and sometimes it means trade-offs between one quality trait over another. Further, there always seems to be one more quality trait to throw into the mix. Examples of the types trade-offs a grower might have to make are choosing a highly digestible brown mid-rib hybrid at the expense of yield or choosing a highly digestible, leafy gene hybrid at the expense of starch content.

Don't sweat the small stuff

As you move through the selection process, it’s important to keep things in perspective and try not to get hung-up on small differences. This is especially true with forage quality traits like NDF digestibility and starch. A point or two one way or the other is not a big deal when comparing hybrids. On the other hand, don’t ignore large differences.

Although there are many more quality traits to analyze today versus ten years ago, keep in mind that yield and other agronomic traits must remain at the top of your selection criteria (spoken like a true agronomist!!). The key to selection on the agronomic side of the fence is consistency.....across years and locations. Generally speaking, look for those hybrids that are routinely in the top 10 percent for milk per acre, a performance criteria that combines both yield and quality terms. Of course there may be times and circumstances when you are looking to maximize a specific trait. Examples might be when your are growing silage specifically for heifers and yield is your primary selection criteria or if you’re after maximum milk production and digestibility or energy is of greatest importance.

A look at the 2003 UW Corn Silage Hybrid Performance data.....

A person can learn a lot by curling up in front of the fireplace on a cold winter night, forgoing the most recent episode of “My Big Fat Obnoxious Fiancé”, and taking a close look at silage hybrid performance data. In the case of the UW trials, the data is widely available in print form and on the internet. Let’s begin by focusing on the South Central Region trial, which includes the Fond du Lac County site (Table 1).

	Yield T/A	Milk Per Ton	Milk Per Acre	Moist %	Kernel Milk	CP %	NDF %	IVD %	NDFD %	Starch %
Min	6.3	3200	20400	57.1	30	6.2	45	78	61	21
Max	10.0	4050	35200	74.3	90	8.6	57	88	77	39
Avg.	8.2	3541	29073	66.8	66	7.1	51	82	65	31

The important point to be gleaned from Table 1 is that there is a large amount of genetic diversity for all of the traits listed. It is this diversity that growers must exploit! Diversity in performance also exists within hybrid trait groups (e.g. Bt

hybrids, Roundup Ready hybrids, leafy hybrids, etc.). Thus, if you narrow your selection criteria down to a few traits, the job still isn't done. You must exploit performance diversity within that group. Here are some general statements that I think currently apply to some of these special trait hybrids:

Bt and Roundup Ready

- Holding their own.....these traits do not seem to compromise other yield or quality characteristics.

Leafy

- A mixed bag.....performance is all over the chart. These are generally average to well below average in starch content.

Brown Mid-rib

- In a class by themselves for digestibility
- Yield is still a concern. New hybrids are said to be better but that will need to be proven.

"Highly Digestible" hybrids

- Generally above average for digestibility, but.....
- Just putting a "HD" in the hybrid name doesn't necessarily mean it's superior in digestibility than some other hybrids without the "HD" designation.
- These should get better with time.

High Oil Corn

- No apparent feeding advantage for silage. Too much dilution effect.

Some final thoughts....

There is no one "best" corn silage hybrid but there clearly are differences in performance among agronomic and forage quality traits. Do your homework now to exploit these differences!!! It's generally never a good idea to make a selection based on one trait. Likewise, don't make selections based solely on performance data from a single location. Think of LOCATIONS as ENVIRONMENTS and obtain data from as many sources as possible (e.g. UW, seed company, on farm tests, etc.). Look for consistency in performance and use agronomic traits to narrow the field of possible selections.

Corn silage quality starts with hybrid selection. However, it can end quickly if a good management isn't applied at the harvest and storage end of the operation. In other words, the extra money spent on an elite hybrid goes into the manure pit if you don't harvest at the proper moisture, insure good packing, and exclude air during the storage period.