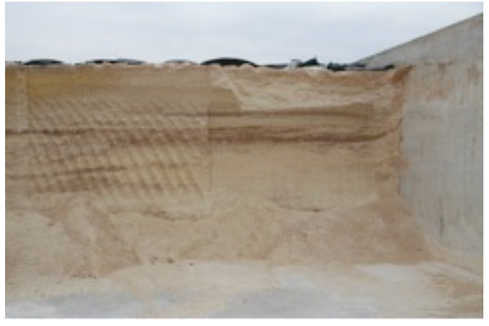

# SQUEEZING PENNIES FROM HIGH MOISTURE SHELLED CORN

When corn is $7, we want to get everything we can from the corn we are feeding.

***What do we have in storage? Is that really high moisture corn? How do we measure quality?***



When I started doing nutrition work 15 years ago, the message was fairly simple. Harvest the high moisture corn at the right moisture (28-32%) and roll lightly. I thought, foolishly, that after 15 years, we would have mastered the timing of the harvest. In **Figure 1**, we can see that almost 50% of the samples submitted as high moisture corn to Rock River Labs (2012 crop year) were less than 26% moisture. Nutritionally, I consider that dry corn and recommend grinding less than 900 microns; unfortunately most producers do not have the equipment to grind that fine. That means almost 50% of the producers put up a product that they cannot process correctly and on the day of harvest they have lost the full potential of their corn.

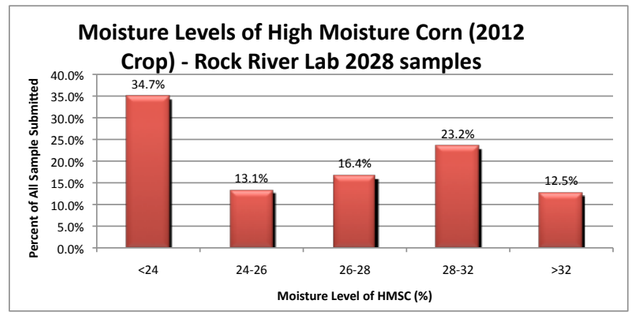



**Figure 1**

***Why can't we harvest HMSC at the right moisture?***

In 2012, corn received plenty of heat units; when harvest time came, it was drying very quickly. Those heat units combined with drought conditions that basically killed (rather than matured) the plant for many folks, resulted in the producer being unable to harvest quickly enough. A producer might have started at 30% moisture and ended at 20%, for the painful average of 25%.

Genetics is another reason we've been chasing moisture. Although a quick dry down is great for those grain boys, it's not so great for those feeding dairy cows with high moisture corn. Almost every year I hear the same thing (even in non-drought years), "Wow that corn really dried down fast, I never had a chance."

If the guys in corn genetics department want a challenge, breed a corn that dries to 29% moisture and then hold that moisture for an extended period. Be original, everyone can get to 15%, but who can get to 29% and stay there?

***Continued...***

Equipment challenges are also part of the puzzle. As dairies have increased in size and corn genetics have reduced corn's drying time, many dairies don't have the equipment or labor capacity to harvest corn in a small window. Many producers have increased harvest capacity to maximize alfalfa and corn silage quality; can we do that economically for high moisture corn? There are many dry downs for corn silage, ask your nutritionist to start that for high moisture corn.

Corn variability also plays into the challenge of high moisture corn. As dairies become larger, they need to harvest multiple fields to meet their corn needs. Many farms will stagger maturities to allow for a longer harvesting window. While this seems to work sometimes, other times, soil conditions or growing conditions result in the entire crop being ready at the same time. Even if one variety is used on the farm, much of dairy country utilizes land that can vary (think rolling hills, soil types, crop rotation). We often end up with a bunker of higher moisture corn that is 24-25% moisture; half of it was put in correctly and half was not. We can often see layers in these bunkers with drier corn that have hard chips of corn that pass through the cow.

From an economic perspective, high moisture corn seems like it should have an advantage over dry corn due to reduced drying, transportation, and processing costs. As we strive toward herd averages of 100 lbs, the value of consistency must be taken seriously. Can you manage high moisture corn economically to achieve that consistency?

***What about identifying quality?*** In the last couple of years, there has been a huge push to identify corn traits that impact starch digestibility. The higher the starch digestibility, the more milk we can expect.

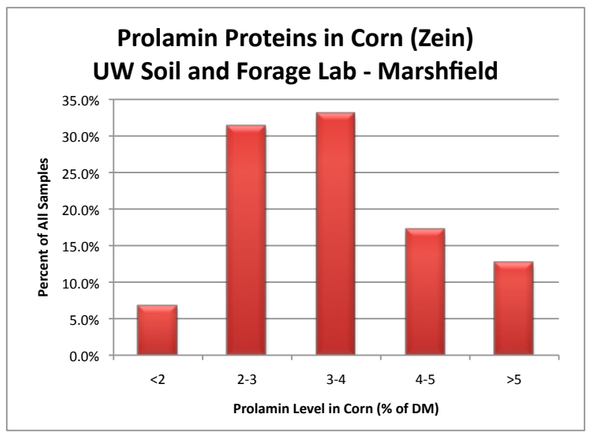



**Figure 2**

We used to think that when a corn sample came back with a higher protein percent, that was great news, we could feed a little less protein in the diet. Well now we know better, most of that increased protein is prolamin and is decreasing starch digestibility. Prolamin protein (zein protein) can encapsulate and reduce starch digestibility in dairy cows. The higher level of this protein, the less digestible the corn. In **Figure 2** we can see the ranges from the 2012 crop year.

These higher prolamin levels result in higher CP in corn. If you look at **Figure 3**, we can see that almost 30% of the samples had protein levels over 10% CP. Some would probably argue that 80% above 8.5% CP is just as alarming but in either case we have a problem. That extra 2% CP is costing the cow in starch digestibility. In dry and high moisture corn (and corn silage), these levels have created problems on some farms. Many nutritionists have pushed their traditional starch numbers up 2% to compensate. Other nutritionists have introduced sugars or corn starch to improve CHO fermentation in the rumen.

For high moisture corn (real high moisture corn), some of this problem will be alleviated as the acids in the fermented product break up the prolamin and starch digestibility increases. But, if you have HMSC that is 24% moisture, will it ferment enough to increase starch digestibility? What if it's 22% or 20%? Rather than focusing on fermentation and its direct byproducts, a more useful measurement is ammonia as a percent of crude protein. As the protein in corn breaks up, ammonia is released. This should point to increased digestibility of the starch in your corn. Unfortunately, corn with very high levels of prolamin may never reach acceptable levels of starch digestibility.

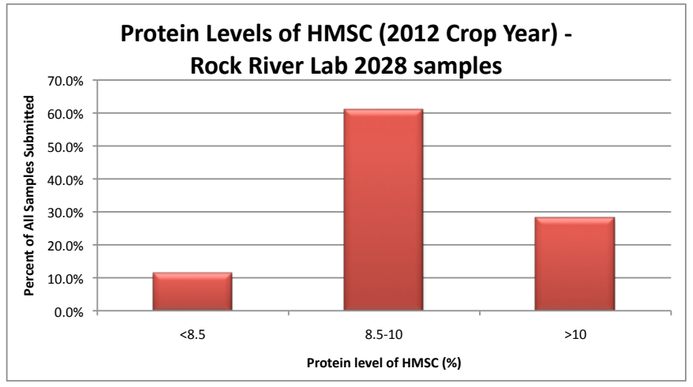



**Figure 3**

What about grind size? On the whole, the industry is much better in measuring and recommending proper grind size for corn. Sending corn samples to the lab for an independent grind size is probably a good idea. If you are grinding your own corn as it comes out of the silo, monthly monitoring can help identify equipment wear. If you are rolling or grinding during harvest, talk to your nutritionist to identify a protocol to measure grinding and moisture during harvest. Coming back a week later to find out there was a problem is too late.

**Some final thoughts:**

- Manure starch evaluations. Stop using just your boot and send some manure in the mail. And yes, pack carefully, unless you want to get on the black list with your postman. A recent UW Extension farm survey showed 25% of farms with fecal starches above 5% (Huibregtse et al. 2012)
- Consider a starch digestibility or total tract analysis offered by some labs.
- Monitor prolamin, ammonia, and moisture levels to track the quality of your corn.
- Consider long term strategies for corn harvest. Can you consistently harvest high quality high moisture corn? If not, what are the economic opportunities to go to some or all dry corn? How much do you value consistency?
- Consider using various CHO sources. Utilizing a mix of dry corn, HMSC, and sugar can be a great tool to maximize rumen efficiency.