# The Consequences of Mistiming Corn Silage Harvest

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Growing high yielding, high quality corn is half the challenge of successful silage production. The other half is timing harvest so forage ferments, ensiles, and is preserved for later feedout. Too wet (>70% moisture) and silage can sour and seep causing low intake by dairy cows. Too dry (<60% moisture) and silage can mold and have lower digestibility, protein, and vitamins A and E. Either way, yield is reduced.

The decision to begin harvest depends upon the storage structure, the number of acres to chop for the equipment available, and the environment. The decision is further complicated when custom choppers are involved because when they show up there is pressure to harvest immediately or they may leave and not return.

There is little discussion about the consequences of mistiming corn silage harvest. Here we describe what happens to corn silage when harvest timing is off using data derived from individual hybrids grown at various locations in the UW silage evaluation program. The entire data set consists of 27,681 observations collected from 1990-2013. Observations were categorized according to harvest moisture where forage was classified as: Too wet (>70% moisture); Ideal (60-70% moisture); and Too dry (<60% moisture). From the entire data set, 8,532 observations had individual hybrids that had been harvested across these moisture categories in various environments. A minimum number of observations was set at 36 (representing more than 12 environments) leaving a total of 5,399 observations for 109 hybrids for analysis (Table 1).

Table 1. Forage yield and quality changes of 109 corn hybrids harvested when forage moisture was too wet or too dry in various environments in the UW silage evaluation program from 1990-2013.

| Harvest Moisture | N | Forage Yield *(tons/ac)* | Forage Moisture (%) | Crude Protein (%) | NDF (%) | ivNDFD (%) | Starch Content (%) | Milk/ Ton *(lbs/ton)* | Milk/ Acre *(lbs/ac)* |
|---|---|---|---|---|---|---|---|---|---|
| Too Wet (>70%) | 801 | 7.3 | 71 | 7.3 | 50 | 59 | 26 | 3,040 | 22,300 |
| Ideal (60-70%) | 2,997 | 8.1 | 65 | 7.0 | 47 | 59 | 30 | 3,180 | 25,900 |
| Too Dry (<60%) | 1,601 | 8.7 | 57 | 6.9 | 44 | 60 | 34 | 3,110 | 27,000 |
| LSD (0.05) | | 0.1 | 1 | 0.1 | 1 | 1 | 1 | 10 | 400 |

On average during the harvest season, forage moisture is lost at the rate of 0.5% per day leaving a 20-day time period as moisture moves from 70% to 60%. Some harvest structures (i.e., bunker, concrete stave silo) only have half of this time (10 days) to fill, pack, and seal while the crop is drying down.

In this data set, forage yield increased 1.4 ton/ac (7.3 to 8.7 tons/ac) as the crop matured and moisture decreased (71% to 57%). Target harvest moisture for the trials is 65%. Within this relatively tight range of moisture, yield increased. However, with further drydown, leaves would be lost as well as other plant parts and yield would likely decrease. Crude protein decreased from 7.3% to 6.9%. NDF decreased from 50% to 44%, while ivNDFD changed little over these moisture ranges. The most dramatic change was starch content which changed from 26% to 34% as the crop matured (moisture decreased). So when we bring these values together and calculate performance indices of Milk/Ton and Milk/Acre, we find optimum quality (Milk/Ton) in the ideal moisture range. When forage is too wet or too dry, Milk/Ton is lower. Because yield and starch content in this data set continues to increase, Milk/Acre increased as the crop matured.

Although this data set did not have extremes as may be found in the real world, trends can be seen regarding the consequences of mistiming harvest. Little change is measured on stover quality (ivNDFD). All of the changes are occurring in the grain portion of corn silage. So, if you are going to err, it is probably better to err on the more mature side of crop development. However, keep in mind there are trade-offs including a significant increase in the risk of potential mold development.