Influence of Relative Maturity on Corn Performance

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There are many decisions to make about corn production throughout the year. The right combination of inputs and cultural practices can provide a nice boost to overall yields. Yet, there is one decision made during the winter months that could influence corn yields more than anything else during the growing season – hybrid selection. Every year in our annual corn variety trials, there is a very large variation in yields based on hybrid alone. In the last four years, five corn variety trials were planted (Carrington dryland and irrigated, Oakes dryland and irrigated, and Fingal dryland). Each trial has ranged in size from about 60 to 105 different hybrids, with maturity ranges from 75 to over 100 day relative maturity (RM), and each hybrid is grown four times (four replicates) in each trial. The trials provide information to evaluate trends in corn performance at different locations and across multiple years. In each year and location, there are differences in yield of 70 bu/ac. Even in 2015 in the Carrington dryland trial, which was relatively low-yielding, the trial average was 138 bu/ac, but varieties ranged from 106 to 178 bu/ac. Proper hybrid selection represents one area where proper choice makes a big difference without increasing costs by much, if at all.

Note: for the comparisons below, relative values were used. Each data point for each year was compared to the trial average. Values greater than 1 represent a number above the trial average, and values less than 1 represent a number below the trial average. Since the silk dates and yields can be drastically different from year to year, this method allows comparisons across the years.

One of the first observations that growers make about a hybrid is that a listed relative maturity date doesn't always seem to hold true for a given growing region. In our trials, we record the date that each hybrid begins silking. This is a good representation of the relative growth of each variety. A comparison was made for the Carrington dryland trial between observed silk date and the listed relative maturity date (Figure 1) to see how accurate these values may be for our area. As expected, the trend is to have a later silk date as the relative maturity increased. However, the correlation was surprisingly weak (R^2=0.32; on a 0-1 scale), meaning that there was a lot of variation from the expected values. If you are curious, here is a website that explains how hybrid maturities are determined: https://www.agry.purdue.edu/ext/corn/news/timeless/HybridMaturity.html. This explains why there may be differences between what is observed and what is listed as the maturity.

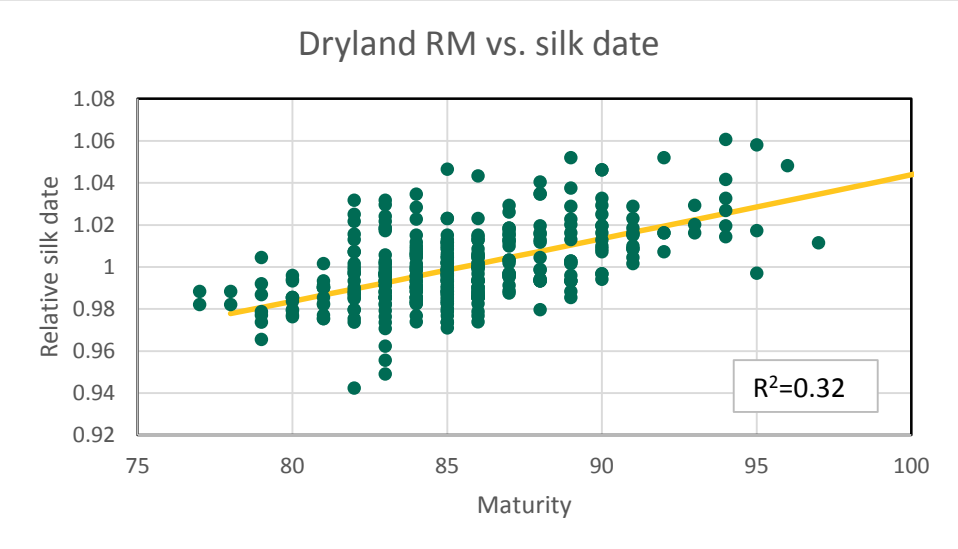

Figure 1. Comparison of stated relative maturity versus corn silk date.

The common perception (and often experience) with hybrid maturity is that the higher the relative maturity, the higher the yield potential. We evaluated this theory with the last four years of data at all

our trial sites. The two trials with the best correlation were the Carrington dryland and irrigated trials (Figure 2 and 3). This shows the expected increase in yield as the relative maturity gets higher. Initially, one might look at the poor correlations here and say that the data doesn't explain much. However, the way to read that data is that hybrid maturity explained roughly 18 (Figure 2) and 24 (Figure 3) percent of the yield differences between the hybrids. In that context, it is still a strong correlation. But it means that 75 percent of the yield differences between hybrids are caused by other factors, most of which would be the genetic package in a particular hybrid (pest resistance traits, drought resistance, nitrogen efficiency, etc.). At our other locations, only the Oakes irrigated trial had a similarly high relationship between yield and maturity. At Oakes dryland and Fingal, there was essentially no relationship between RM and yield. The underlying message here is that a higher maturity hybrid does not guarantee a higher yield.

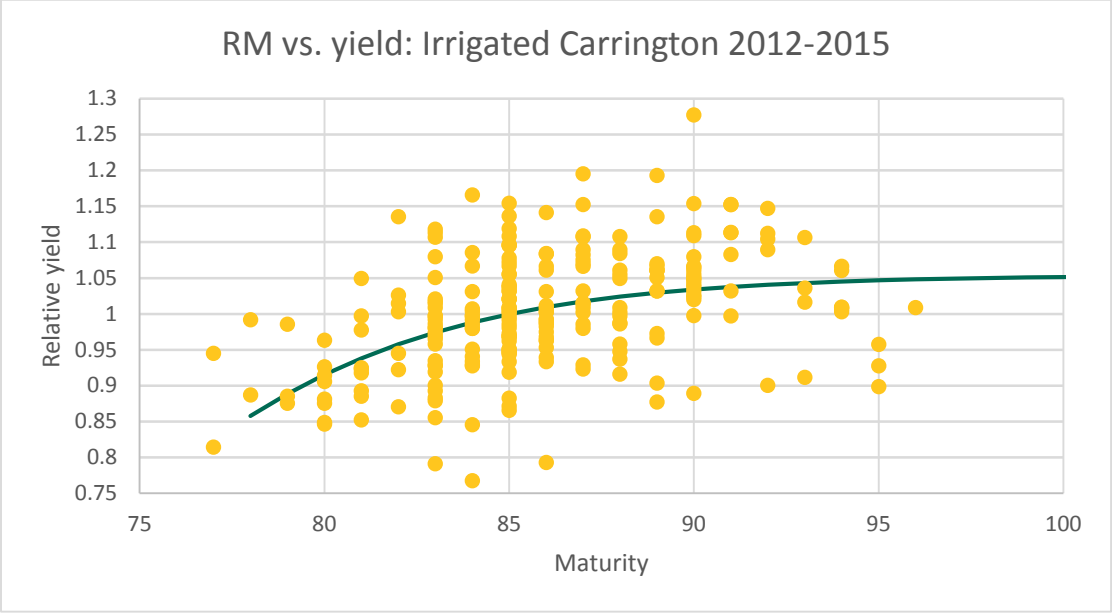

Figure 2. The influence of hybrid maturity on grain yield in irrigated corn.

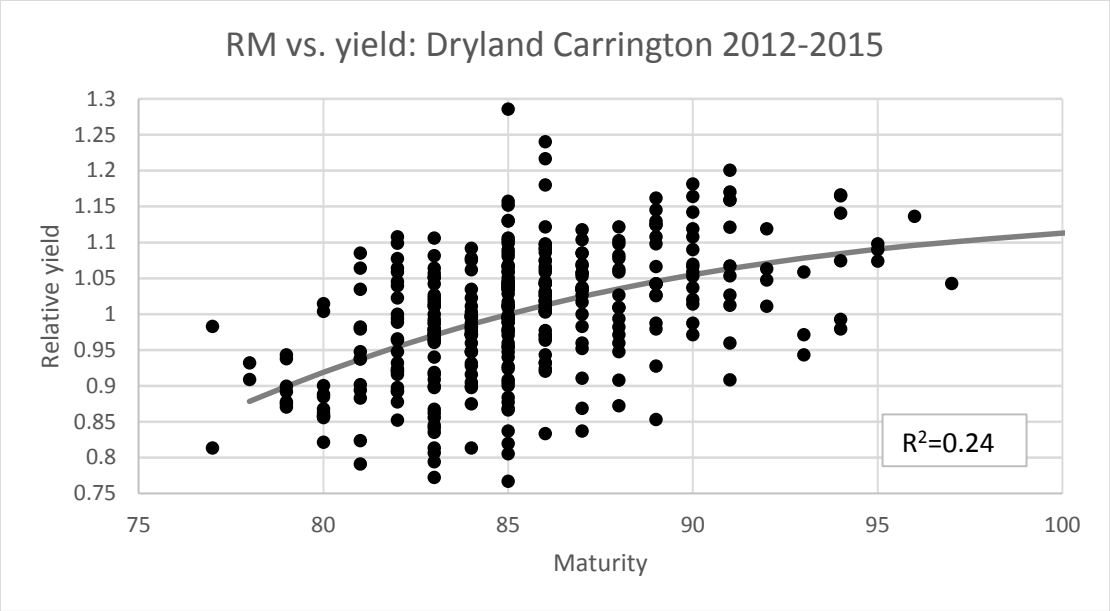

Figure 3. The influence of hybrid maturity on grain yield in dryland corn.

For reference, the observed silking date was a better predictor of harvest moisture than the listed relative maturity for a variety for these trials. The correlations were in the low 30s with listed RMs compared to upper 30s for the observed values. This once again indicates that there are many genetic factors other than relative maturity that will influence the dry-down in corn.