March 31, 2017

WEATHER INFLUENCE WITH CORN

Last week I had an opportunity to hear Elwynn Taylor, extension climatologist at Iowa State University, who was in Lincoln. What a day where we received a nice slow soaking rain. If all it takes is to invite Taylor to get a nice rain, let's keep those cards in our pocket! Taylor is well known for his analysis of weather influence in the Corn Belt. He is widely recognized for his clear explanations of the complexities of long-term weather variability. His entire talk is worth your time and is at: https://mediahub.unl.edu/media/7236

Elwynn says USDA does a poor job of predicting the nation's actual corn crop potential in season every year except they do an outstanding job being consistent of the methods they use. He said they were correct four years since 1964. However, because of a consistent way, it is the farmers challenge to predict which side of the line we are headed during the growing season. You can do this by watching growing degree days at weather stations in season and comparing that with past years, relative precipitation and heat stress with high night temperatures, particularly above 86 degrees F.

One of the predictive tools Taylor uses is July and August night time temperatures and finding similar past year's data and corn yields. Corn producers are generally aware that high night temperatures, especially above 80 degrees F, can be detrimental to yield; however, the effects on specific plant processes and yield components are not as well-understood.

Corns has its genetic roots in Mexico uplands where it consisted of warm days and cool nights. Currently there are two camps of thought why corn yields are lower with higher than usual night temperatures.

The corn plant goes through respiration at night. During the day sugars and starches are produced and stored from photosynthesis and at night some of the sugars are consumed by the cells to perform several important functions. The process that runs during the night is called dark respiration. Respiration means to "burn."

While we are comfortable in air conditioning at home on an 86 degree night a corn field burns energy. When nighttime temperatures are below 70 degrees F, the entire system runs smoothly and highly efficient. As temperatures increase, more energy is required by the plant to stay alive and remain cool. Taylor calculated the plant energy burn or yield penalty due to respiration to be only about one-quarter of a bushel per day on hot nights. He says the majority of bushel loss is coming from another direction and the relationship is almost linear.

Higher temperature accelerates the development of the corn plant so the corn plant matures sooner. The longer the fill period between silking and beginning dent stage with adequate water supply, the higher the yields. He has measured differences in Iowa during the critical grain fill stage from 39 to 58 days depending on the year. Look at July and August—the period from silking to maturity. If nights are mainly warmer than usual the yield is reduced. Nights cooler than usual tend to enhance yields.

Taylor also charted out 18-year cycles of consistent yields cycles followed by 25-year volatile yield cycles in the nation's Corn Belt. Year one of the volatile cycle around trendline yields was the drought of 2012. He talked about the Gleissberg Cycle. This has to do with the condition of the sun. We pay attention to this roughly 89-year cycle. The harshest year of the 1800's was 1847. The harshest year of the 1900's was 1936. If we are going to have Dust Bowl like weather in this century, that would put the harshest year for this century, around 2025.

Taylor said weather is the Number 1 risk we have in agriculture and is greater in the next 20 years. We can't manage the weather, but we can manage the risk.

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