Virginia Cooperative Extension

Using the Virginia Cooperative Extension Climate Analysis Web Tool to Develop a Corn Planting Strategy

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Introduction

With adequate soil moisture, early-planted corn generally out yields late-planted corn due to its better use of sunlight during June and July. Even though corn germination and emergence will occur at soil temperatures of 50°F, growth and emergence remain slow until soil temperatures reach at least 55°F. The goal for most producers is to plant as early as possible and still achieve rapid emergence and a good crop stand.

Moisture stress that occurs near the silking stage in corn results in the largest potential yield losses (Table 1). It is important to choose appropriate hybrids and planting dates so that the crop is least likely to undergo stress at this stage. Understanding climatic history can help producers determine the planting window that most likely will result in success.

Table 1. Percent yield loss from four days visible wilting at various corn developmental stages.

Growth Stage	% Yield loss from 4 days of visible wilting
Early Vegetative	5-10
Tassel Emergence	10-25
Silking	40-50
Blister	30-40
Dough	20-30

Classen and Shaw, 1970

Soil temperature information for most sites in Virginia is not readily available, but air temperature is. By assuming that air temperature and soil temperature are related, producers can use historic air temperature data to select a calendar date after which corn planting is likely to result in a successful stand. It is important to remember that soil temperatures under conventional tillage are likely higher than air temperature, and that soil covered with residue warms more slowly and is likely cooler. Examples of how this information has been used in Virginia are available in *Corn Planting Dates in the Virginia Coastal Plain: How Early is Early?*, Virginia Cooperative Extension publication 424-033, *http://pubs.ext. vt.edu/424-033/*, and *Corn Planting Dates in the Piedmont and Valley Regions of Virginia: How Early is Early?*, Virginia Cooperative Extension publication 424-032, *http:// pubs.ext.vt.edu/424-032/*. In the past, producers who wanted to use historic temperature data for planning had to rely on their own on-farm records or on memories of past planting success or failure to develop a planting schedule. By using the Virginia Cooperative Extension Climate Analysis Web Tool, producers can access the National Oceanographic and Atmospheric Administration information on temperature and rainfall for 167 sites in Virginia, typically going back more than 40 years.

Creating a Corn Planting Strategy

After selecting reports from a particular station or stations, producers can do an analysis to develop a corn-planting strategy. The Climate Analysis Web Tool can provide valuable information for general planning, but it will not be specific enough for any one year. Producers should use historic data to identify a general planting window and use current forecasts to fine-tune planting dates.

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Using the Web Tool

The Virginia Cooperative Extension Climate Analysis Web Tool website will allow producers to access three weather stations closest to a selected location in Virginia. Each station is listed by its distance from the selected site, its latitude and longitude, and the dates for which weather data are available. Producers can access the data using the following instructions.

- Go to *http://www.ext.vt.edu/cgi-bin/WebObjects/ ClimateAnalysis.woa*.

- Scroll down to the map of Virginia.

- Point and click at a specific location on the map.

- Scroll down the page to "Relevant Stations (Ranked by distance)."

- Click on the box in front of the most appropriate station from which to generate reports.

- Click on "Select Reports."

- Scroll down the new page to the station chart.

- Select the dates to evaluate.

- Check the box after "About Temperature Summary."

- Click on "Generate Reports" above the station chart.

Planting Temperature

Most producers would do well to look at March 15 to April 30 for at least a ten-year period. They should look for the point where the average temperature reaches or exceeds 55°F. In most years, average temperatures will go back down after this point for a short time and then will begin a steady climb. At this point, it is important to use current temperatures to modify the planting strategy. Producers can consider beginning planting at the early date if the local weather forecast calls for several days of warm weather. If the near-term forecast is for cooler weather, producers should delay planting until temperatures warm.

Rainfall at Tasseling

The most critical time in the development of the corn plant occurs at silk emergence (silking). Moderate to severe moisture stress at this stage can result in 30 percent to 50 percent yield loss. With this thought in mind, it would be prudent for producers to select hybrid maturity and schedule planting to occur at such a time that tasseling will occur during the period with highest average rainfall to ensure an adequate supply of soil moisture. Knowing the exact date of future rain is impossible, but a review of historic data offers insight into rainfall patterns. This is where the Climate Analysis Web Tool can help. The process is the same as for temperature except that producers check the box after "About Precipitation Summary." Since tasseling will likely occur from mid-June to mid-July, producers should review this time period and look for weeks with higher average rainfall. They should avoid periods with a very high probability of rainfall of less than 0.1 inch. Depending on a producer's location, there is probably one or maybe two weeks that fit this pattern. Producers should then adjust the planting date and hybrid maturity selection as necessary to maximize the likelihood of hitting this window. For example, the rainfall data for Painter, Va., from mid-June to mid-July for the time period from 1954 to 2004, shows the likelihood of more than 0.3 inch of rainfall is greater in the first two weeks of July than in the week after or prior to this period (Table 2). In fact, the 50 years of historic data show that even in years that are significantly drier than normal (30th percentile), at least 0.2 inch of rain falls during the first week of July as compared to 0.1 inch in the last week of June.

Summary

Reviewing past weather information allows producers to know historic trends in temperature and precipitation and to schedule crop management activities accordingly.

This information will not be applicable in planning to the day, but will facilitate an educated planning process. The Virginia Cooperative Extension Climate Analysis Web Tool allows access to this information and can be a valuable tool for today's producer to use in developing an optimal planting window and hybrid maturity selection strategy.

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Table 2. Analysis of Precipitation at Painter, Va., 2 W (50 Years).

	6/1-6/7	6/8-6/14	6/15-6/21	6/22-6/30	
Average	**0.84**	**0.75**	**0.91**	**0.71**	
Percentile					
100	4.40	2.70	4.28	4.82	
90	2.02	1.87	2.24	2.06	
80	1.42	1.57	1.45	1.29	
70	1.14	1.18	1.25	0.78	
60	0.66	0.88	0.91	0.47	
50	0.58	0.70	0.75	0.21	
40	0.50	0.31	0.54	0.15	
30	0.28	0.19	0.35	0.01	
20	0.11	0.04	0.07	0.00	
10	0.03	0.00	0.01	0.00	
0	0.00	0.00	0.00	0.00	

	7/1-7/7	7/8-7/14	7/15-7/21	7/22-7/28	7/29-7/31
Average	**0.84**	**0.75**	**0.91**	**0.48**	**0.23**
Percentile					
100	3.09	9.57	4.75	4.70	5.46
90	1.50	2.77	2.21	2.72	2.74
80	1.10	1.48	1.59	1.61	1.08
70	0.68	1.08	1.03	1.29	0.67
60	0.53	0.64	0.65	0.97	0.47
50	0.40	0.53	0.38	0.70	0.29
40	0.32	0.34	0.20	0.47	0.10
30	0.20	0.16	0.14	0.35	0.04
20	0.11	0.02	0.00	0.15	0.00
10	0.00	0.00	0.00	0.06	0.00
0	0.00	0.00	0.00	0.00	0.00