



## Corn Planting Dates in the Piedmont and Valley Regions of Virginia: How early is early?

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Early-planted corn generally produces higher yields than later-planted corn due to improved utilization of sunlight during the long days of June and July, assuming moisture is adequate. Also, silage harvest can begin earlier and drying costs are reduced for grain corn; and earlier harvest enables growers to begin preparation for the fall seeding of small grain crops.

However, a significant amount of early-planted corn is replanted in Virginia in some years because of poor stands. Many of these poor stands can be attributed to warm temperatures in early April followed by low temperatures during the last three weeks of April.

Corn requires a minimum temperature of 50°F to germinate, and even at 55°F germination and growth are slow. Soil temperatures under conventional tillage can be higher than air temperatures if several days of bright sunshine have provided energy for soil warming. But with surface mulches in place for no-tillage production, soil temperatures are generally colder and warm more slowly. **The objective of this publication is to answer the question, “how early is early?” for planting corn in the Piedmont and Valley regions of Virginia.**

To obtain a general answer to the question of “how early is early?” to plant corn, we have summarized 30 years of April air temperature records for 6 locations in the Virginia Piedmont and Valley regions (Figs. 1 and 2). The locations are Warrenton, Farmville, and Danville in the Piedmont (Fig. 1), and Winchester, Staunton, and Abingdon in the Valley region (Fig. 2).

Examination of these data for the Piedmont region (Fig. 1) shows that temperatures generally rise during the first week of April throughout the Piedmont. The average air temperature is above 50°F at Danville and Farmville, but is only 50°F for Warrenton, VA. However, average temperatures decline at all locations during the second week before beginning a steady to upward trend. The data are averages and thus indicate that severe cold fronts do move through Virginia in many years during the second week of April. **Also, these data indicate that corn planted during the first week of April can be at significant risk to damage by low temperatures, especially in no-tillage conditions and particularly in the northern Piedmont.**

A further analysis of the data for the Piedmont region is presented in Tables 1-3. The number of days and percentage of days that air temperatures, on-average, will be above the corn growth threshold of 50°F is calculated for the first two weeks and the last two weeks of April at each location. For example, at Warrenton, VA (Table 1) if corn is planted on April 6, we can expect only 51% of the days during the first two weeks of April to have average temperatures above 50°F. However, for corn planted on April 16, 77% of the days remaining in April are expected to have average temperatures above 50°F. The risk of stand loss due to low temperatures is much less.

In contrast to the Warrenton data, temperatures at Danville, VA (Table 3) show that for corn planted on April 1, 70% of the days during the first two weeks of April are expected to have average air temperatures above 50°F. Temperature data from April 16 until the end of April show that 87% of

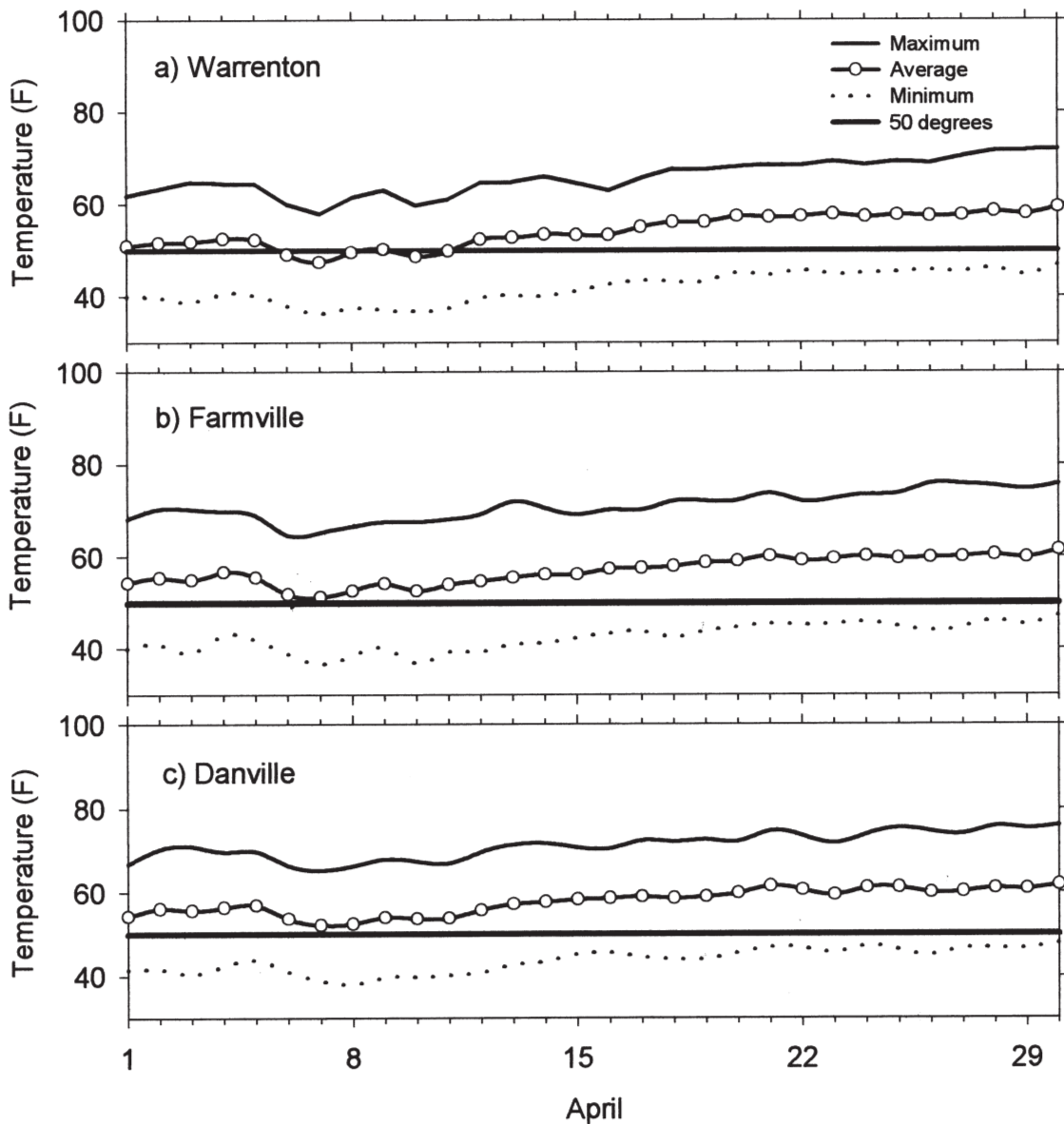
<sup>1</sup>Research supported by the Virginia Corn Board, the Foundation for Agronomic Research, and the Virginia Agricultural Experiment Station.

the days are expected to have air temperatures above 50°F.

Analysis of the Valley region graphs (Fig. 2) show that average temperatures are near 50°F for all locations for the first week of April, and that temperatures, on average, decline during the second week of April. Again, these data reflect cold fronts that move across Virginia in the second week of April in many years. However, by April 12 to 13, a general trend is observed for temperatures to be steady to higher for the rest of April (Fig. 2). Calculation of the percentage of days above 50°F during the first two weeks of

April and the last two weeks of April is presented in Tables 4-6. These data show that at Winchester and Staunton, it is the 3rd and 4th weeks of April before 60% or more of the days in that two-week period are expected to be above 50°F. In the southern part of the Valley region at Abingdon, temperatures are slightly higher (Table 6).

So how do we use this information? Weather forecasts for temperatures are generally much more reliable than precipitation forecasts. Therefore, in the Piedmont if the first and second weeks of April



are warm and soil temperatures have reached acceptable levels for planting, the following 1 to 2-week temperature forecast should be consulted. Planting should proceed if temperatures are steady to rising. However, planting should be delayed if a significant cold front is approaching, as the data indicate does occur in many years. In the Valley region, temperatures can be expected to warm above the threshold 50°F by mid-April but will only be slightly above this level until the last week of April. These averages reflect the cold temperatures that can

occur throughout April in the Valley region. Planting should be delayed in the Valley if the temperature forecast indicates a major cold front approaching the region during the last two weeks of April.

Careful analysis of temperatures for a specific location with reference to long-term averages should aid growers in determining planting dates. Optimizing planting dates enables growers: (1) to obtain the benefits of early planting with reduced risk of stand loss; (2) avoid replanting costs; (3) avoid yield loss from uneven stands that are too good to

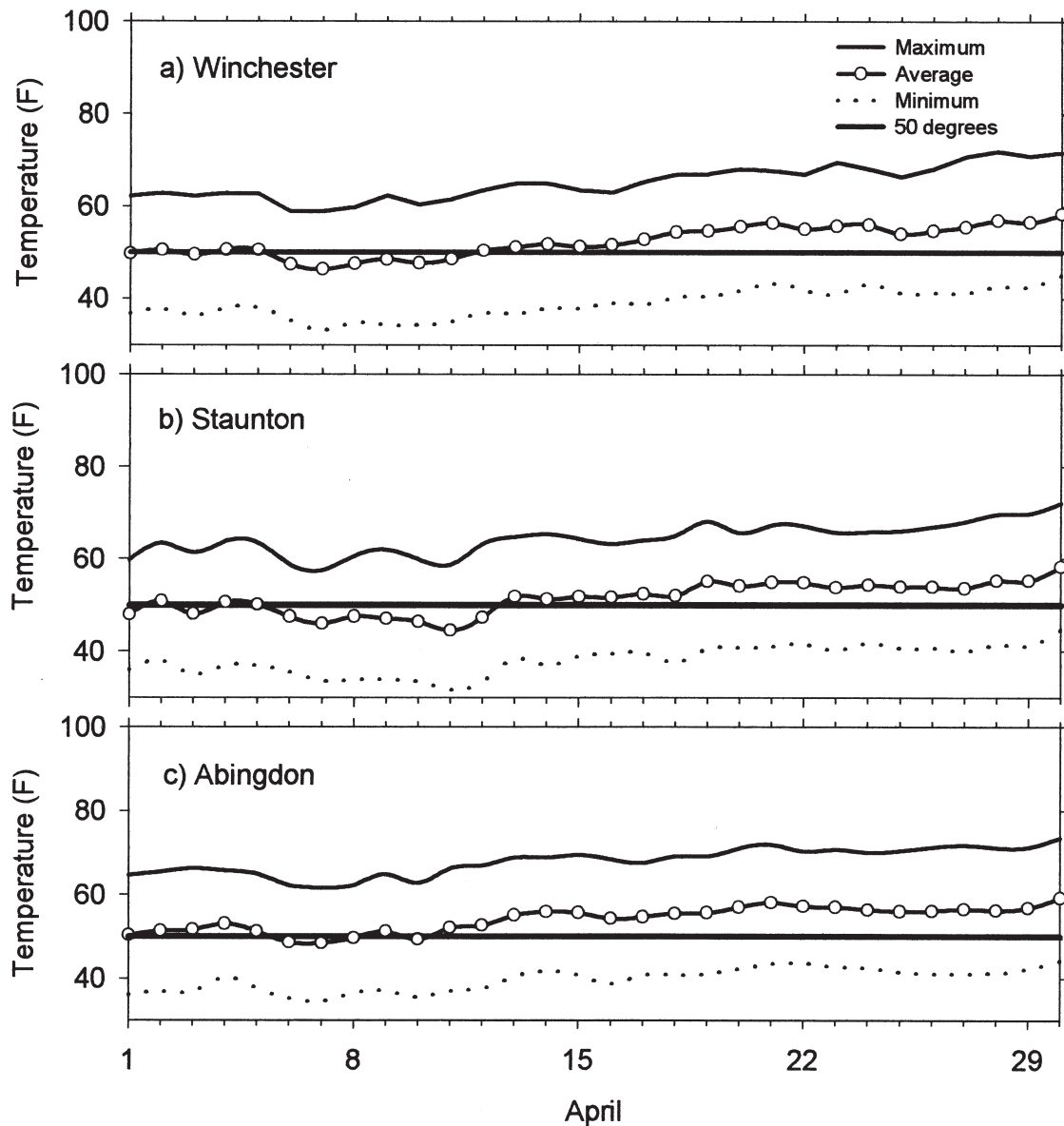


Figure 2: Maximum, minimum, and average temperatures (30 years) during April for three locations in the Valley region of Virginia.

Table 1: Warrenton, VA<sup>1</sup>—Number of days above 50°F as a percentage of days remaining for the first two weeks and second two weeks of April.

Day in April	Number of days until April 15	Number of days above 50°F expected	Percentage of days	Day in April	Number of days until April 30	Number of days above 50°F expected	Percentage of days
1	15	7.6	50.6	16	15	11.6	77.3
2	14	7.2	51.4	17	14	11.1	79.3
3	13	6.7	51.5	18	13	10.4	80.0
4	12	6.2	51.6	19	12	9.6	80.0
5	11	5.6	50.9	20	11	8.9	80.9
6	10	5.1	51.0	21	10	8.2	82.0
7	9	4.7	52.2	22	9	7.4	82.2
8	8	4.3	53.8	23	8	6.6	82.5
9	7	3.8	54.3	24	7	5.9	84.3
10	6	3.4	56.7	25	6	5.1	85.0
11	5	3.0	60.0	26	5	4.2	84.0
12	4	2.5	62.5	27	4	3.4	85.0
13	3	2.0	66.7	28	3	2.6	86.7
14	2	1.3	65.0	29	2	1.8	90.0
15	1	0.6	60.0	30	1	0.9	90.0

<sup>1</sup>Based on average temperature data for the 30 years (1970-1999) at Warrenton, Va.

Table 2: Farmville, VA<sup>1</sup>—Number of days above 50°F as a percentage of days remaining for the first two weeks and second two weeks of April.

Day in April	Number of days until April 15	Number of days above 50°F expected	Percentage of days	Day in April	Number of days until April 30	Number of days above 50°F expected	Percentage of days
1	15	9.9	66.0	16	15	13.0	86.7
2	14	9.3	66.4	17	14	12.1	86.4
3	13	8.7	66.9	18	13	11.3	86.9
4	12	8.1	67.5	19	12	10.4	86.7
5	11	7.3	66.4	20	11	9.6	87.2
6	10	6.6	66.0	21	10	8.8	88.0
7	9	6.0	67.5	22	9	8.0	88.9
8	8	5.4	67.5	23	8	7.2	90.0
9	7	4.8	68.6	24	7	6.4	91.4
10	6	4.2	70.0	25	6	5.5	91.7
11	5	3.7	74.0	26	5	4.6	92.0
12	4	3.0	75.0	27	4	3.6	90.0
13	3	2.3	76.6	28	3	2.7	90.0
14	2	1.5	75.0	29	2	1.9	95.0
15	1	0.8	80.0	30	1	0.9	90.0

<sup>1</sup>Based on average temperature data for the 30 years (1970-1999) at Painter, Va.

Table 3: Danville, VA<sup>1</sup>—Number of days above 50°F as a percentage of days remaining for the first two weeks and second two weeks of April.

Day in April	Number of days until April 15	Number of days above 50°F expected	Percentage of days	Day in April	Number of days until April 30	Number of days above 50°F expected	Percentage of days
1	15	10.5	70.0	16	15	13.1	87.3
2	14	9.9	70.7	17	14	12.2	87.1
3	13	9.1	70.0	18	13	11.3	86.9
4	12	8.5	70.8	19	12	10.5	87.5
5	11	7.8	70.9	20	11	9.6	87.2
6	10	7.0	70.0	21	10	8.8	88.0
7	9	6.3	70.0	22	9	7.8	86.7
8	8	5.7	71.3	23	8	7.0	87.5
9	7	5.1	72.8	24	7	6.2	88.5
10	6	4.5	75.0	25	6	5.4	90.0
11	5	3.9	78.0	26	5	4.5	90.0
12	4	3.2	80.0	27	4	3.6	90.0
13	3	2.4	80.0	28	3	2.8	93.0
14	2	1.7	85.0	29	2	1.9	95.0
15	1	0.9	90.0	30	1	1.0	95.0

<sup>1</sup>Based on average temperature data for the 30 years (1970-1999) at Danville, Va.

Table 4: Winchester, VA<sup>1</sup>—Number of days above 50°F as a percentage of days remaining for the first two weeks and second two weeks of April.

Day in April	Number of days until April 15	Number of days above 50°F expected	Percentage of days	Day in April	Number of days until April 30	Number of days above 50°F expected	Percentage of days
1	15	6.4	42.7	16	15	10.0	66.7
2	14	5.9	42.1	17	14	9.5	67.9
3	13	5.4	41.5	18	13	8.9	68.5
4	12	4.9	40.8	19	12	8.3	69.2
5	11	4.4	40.0	20	11	7.6	69.1
6	10	4.0	40.0	21	10	7.0	70.0
7	9	3.7	41.1	22	9	6.3	70.0
8	8	3.4	42.5	23	8	5.6	70.0
9	7	3.0	42.9	24	7	4.9	70.0
10	6	2.6	43.3	25	6	4.2	70.0
11	5	2.3	46.0	26	5	3.6	72.0
12	4	1.9	47.5	27	4	3.0	75.0
13	3	1.5	50.0	28	3	2.2	73.3
14	2	1.0	50.0	29	2	1.6	80.0
15	1	0.5	50.0	30	1	0.9	90.0

<sup>1</sup>Based on average temperature data for the 30 years (1970-1999) at Winchester, Va.

**Table 5: Staunton, VA<sup>1</sup>— Number of days above 50°F as a percentage of days remaining for the first two weeks and second two weeks of April.**

Day in April	Number of days until April 15	Number of days above 50°F expected	Percentage of days	Day in April	Number of days until April 30	Number of days above 50°F expected	Percentage of days
1	15	6.5	43.3	16	15	9.3	62.0
2	14	6.1	43.6	17	14	8.8	62.9
3	13	5.6	43.1	18	13	8.2	63.1
4	12	5.2	43.3	19	12	7.6	63.3
5	11	4.6	41.8	20	11	7.0	63.6
6	10	4.2	42.0	21	10	6.4	64.0
7	9	3.8	42.2	22	9	5.8	64.4
8	8	3.5	43.8	23	8	5.1	63.8
9	7	3.1	44.3	24	7	4.6	65.7
10	6	2.7	45.0	25	6	4.0	66.7
11	5	2.4	48.0	26	5	3.4	68.0
12	4	2.0	50.0	27	4	2.9	72.5
13	3	1.6	53.3	28	3	2.2	73.3
14	2	1.0	50.0	29	2	1.5	75.0
15	1	0.5	50.0	30	1	0.9	90.0

<sup>1</sup>Based on average temperature data for the 30 years (1970-1999) at Staunton, Va.

**Table 6: Abingdon, VA<sup>1</sup>— Number of days above 50°F as a percentage of days remaining for the first two weeks and second two weeks of April.**

Day in April	Number of days until April 15	Number of days above 50°F expected	Percentage of days	Day in April	Number of days until April 30	Number of days above 50°F expected	Percentage of days
1	15	8.6	57.3	16	15	11.2	74.7
2	14	8.1	57.9	17	14	10.6	75.7
3	13	7.5	57.7	18	13	9.9	76.2
4	12	7.0	58.3	19	12	9.2	76.7
5	11	6.3	57.3	20	11	8.5	77.3
6	10	5.8	58.0	21	10	7.6	76.0
7	9	5.4	60.0	22	9	6.8	75.6
8	8	5.1	63.8	23	8	6.0	75.0
9	7	4.6	65.7	24	7	5.3	75.7
10	6	4.1	68.3	25	6	4.5	75.0
11	5	3.5	70.0	26	5	3.8	76.0
12	4	2.9	72.5	27	4	3.0	75.0
13	3	2.3	76.7	28	3	2.3	76.7
14	2	1.5	75.0	29	2	1.6	80.0
15	1	0.7	70.0	30	1	0.9	90.0

<sup>1</sup>Based on average temperature data for the 30 years (1970-1999) at Abingdon, Va.