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Ralph E. Neild
University of Nebraska - Lincoln

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Effects of Weather on Corn Planting and Seedling Establishment

Ralph E. Neild, Extension Climatology Specialist

Corn planting usually begins when the average daily temperature first rises 55°F and the soil becomes sufficiently warm enough to initiate germination and sustain seedling growth. This may be as early as the middle of March in central Texas 700 miles south of Nebraska or as late as the middle of May in central South Dakota. Corn may be planted as early as the first week of April in southeast Nebraska and continue into the first week of June. Most of the corn, however, is planted between May 4 and May 21.

Corn planted early when the temperature is cool takes longer to germinate and become established than at later planting dates. Reserves in the seed surrounding the germinating embryo provide food to nourish the young seedling for about 21 days. After this, the roots must be sufficiently well established to extract nutrients from the soil and two leaves must be developed to begin the important function of photosynthesis. The young plant is not well established until this occurs.

When the temperature is below 55°F, germination is slow, seedlings are weak, plant stands are poor, and more than 21 days are required for the young crop to become established. The germination rate and time for seedling establishment is closely related to temperature; about 200 degree days above 50°F are required. *Table I* gives the average air temperatures at the time corn is usually planted, the estimated date of seedling establishment, and the number of days from planting for different regions in Nebraska.

As shown in *Table I*, the rate of seedling establishment varies with time of planting from region to region. For example, corn sown April 26 in southeast Nebraska, when the average daily temperature has risen to 56°F, can be expected to become established about 19 days later. By June 7, when the temperature has risen to 70°F, only 9 days are required. However, the temperature is cooler and the spring season is later north and westward across Nebraska. In the Panhandle, the daily temperature averages only 48°F on April 26; 37 days for establishment would be expected for sowing at this early date. The temperature does not rise to 55°F in the Panhandle until the middle of May. This is three weeks later than in southeastern Nebraska.

Table I. Average air temperature at planting, estimated date, and days for seedlings to be established for times when corn is usually planted in different regions of Nebraska.

PLANTING TIME												
	Early			Peak Period						Late		
		4/26			5/4			5/21			6/7	
	°F	date	days	°F	date	days	°F	date	days	°F	date	days
Southeast	56	5/15	19	59	5/20	16	65	6/2	12	70	6/16	9
East	53	5/20	24	55	5/23	19	63	6/3	13	69	6/17	10
Northeast	52	5/22	26	55	5/25	21	62	6/4	14	67	6/17	10
South Central	54	5/19	23	57	5/22	18	64	6/2	12	69	6/17	10
Central	52	5/23	27	55	5/25	21	62	6/8	15	68	6/17	10
North Central	49	5/27	31	53	5/29	25	60	6/5	15	65	6/17	10
Southwest	53	5/21	25	56	5/24	20	63	6/3	13	68	6/17	10
Panhandle	48	6/2	38	51	6/3	30	57	6/9	19	63	6/20	13

The temperature 2 inches under bare soil averages 3 to 4 degrees *warmer* than the air temperature; at 4 inches it is about the same as the air temperature. At corresponding depths under sod or heavy crop residue, the temperatures are 3 to 4 degrees *cooler* than for bare soil. Thus, germination will be slower and seedling establishment later when corn is planted deep, planted in crop residue or in land recently prepared from sod than planted in soil that has been plowed in the fall. Average soil temperatures at 2 and 4 inches under bare soil and cover for different locations in Nebraska are shown in *Table II*.

Table II. Average temperatures at 2 and 4 inches depths under bare soil and surface covered with sod or mulch.

			4/26-5/2	5/3-5/9	5/10-5/16	5/17-5/23	5/25/30	5/31-6/6
		in	°F	°F	°F	°F	°F	°F
East (Mead)	Bare	2	59	61	64	68	71	74
		4	56	58	61	64	74	74
	Cover	2	54	57	60	63	66	68
		4	52	54	57	60	68	65
Northeast (Concord)	Bare	2	57	60	62	66	69	72
		4	54	56	59	63	66	68
	Cover	2	53	56	56	62	64	67
		4	51	54	56	59	61	64
South Central (Clay Center)	Bare	2	58	60	63	66	70	72
		4	55	57	60	63	66	74
	Cover	2	54	56	59	62	65	67
		4	52	54	56	59	62	64
North Platte	Bare	2	56	60	63	66	69	72
		4	59	57	59	63	66	68

	Cover	2	53	56	60	62	64	66
		4	51	54	56	59	61	64
Panhandle (Mitchell)	Bare	2	56	58	61	64	66	69
		4	53	55	58	61	64	66
	Cover	2	52	56	57	60	62	65
		4	50	53	55	57	60	62

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