

## BASE PLANTING ON SOIL TEMPERATURE

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It's the time of the year to remind gardeners to base vegetable planting on soil temperature rather than air temperature. And the same is true for annual flowers.

On March 22, the daily average bare soil temperature at a 4 inch depth in northeast Nebraska ranged from 32 to 44 degrees Fahrenheit. This information can be found at <https://cropwatch.unl.edu/soiltemperature>. Home gardeners can also purchase an inexpensive metal thermometer for soils at garden centers.

When planting seed, soil temperature determines if and how fast seed will germinate. There is a minimum, optimum and maximum soil temperature for different vegetables. While seed will germinate at the minimum, it can take many days longer than at optimum temperatures.

Vegetables are classified as either warm or cool season. The seed of cool season crops will germinate at lower soil temperatures and most are tolerant of light frost. The seed of warm season crops require warmer soil temperatures for seed germination and these crops are not frost tolerant.

When reading vegetable seed packets, for cool season crops it often recommends planting as soon as soil can be worked in spring. While this can work fine, gardeners could end up planting at the minimum temperature rather than optimum.

The goal of planting early is usually to achieve an earlier harvest. However, planting at minimum or colder soil temperatures does not necessarily translate to an early harvest. It may do the opposite.

Using carrots as an example, the minimum temperature at which their seed will germinate is 40 degrees Fahrenheit with the optimum range being 45 to 85 degrees.

At the minimum of 40 degrees, carrot seed planted one-half inch deep can take 51 days to germinate. By waiting until soil temperatures reach 50, carrot seed can germinate in as little as 17 days. Gardeners can see why they may not get an earlier harvest by simply planting early when soils are not warm enough.

Some cool season vegetables, like carrots, beets, onions, cabbage and potatoes, are not negatively affected by hot summer air temperatures. Even if they mature during high temperatures, their quality is not reduced. For these vegetables, it's fine to hold off for warmer soils.

Other cool season vegetables, like peas, broccoli, cauliflower, radish, lettuce and spinach are negatively affected by hot summer air temperatures. When they mature during higher temperatures, their flavor can be bitter and yields reduced. Cole crops may be triggered to bolt or send up a seed stalk.

For these vegetables, there may be some benefit to planting nearer to the minimum soil temperature. But don't overlook how slow seed can germinate at minimum temperatures.

On seed packets, it often recommends planting warm season vegetables after the danger of frost since they are not frost tolerant. In Nebraska, most warm season crops are not planted until May.

The minimum soil temperature for most warm season crops like beans, cucumbers, melons, and squash, is 60 degrees with optimum being 60 to 85 degrees. For muskmelon and watermelon, the optimum range is 70 to 95 degrees.

And what about transplants where we don't have to worry about seed germination? Keep in mind root growth and function will also be more rapid nearer optimum soil temperatures for vegetables.