



## Frost – Cold Temperatures Bring an End to the Gardening Season

Eastern Nebraska has been lucky so far - no frost or freezing temperatures yet this fall. But we all know it's coming soon. Of course, we're at the end of the gardening season. But if you have tender plants you want to keep growing for a while longer, it's important to pay attention to weather forecasts and provide protection if freezing temperatures threaten.



The average first fall frost for Lancaster County is about October 10th; between October 6th and 9th to be specific. These dates are determined from over 47 years of weather data, starting in 1949. It's a good guideline to estimate when frost will occur, but since this is an average first fall frost date, half of all autumn freezes will occur before these dates and half will occur after.

### What is Frost?

Frost is the formation of small ice crystals on a surface, like leaves, petals or grass. To understand frost formation, you also need to understand dew point. The term "dew point" is the air temperature at which air is fully saturated with water vapor, so water is evaporating at the same rate as it is condensing.

When the temperature of a surface, like a leaf, falls below the current dew point of the air, water begins to condense on the leaf surface. Dew on grass and plant leaves is a common occurrence, but when the leaf surface temperature is also below freezing the water transitions directly to white ice crystals as it condenses on the leaf.

If the air is very dry, visible frost may not form even if air temperatures fall below freezing

Gardeners know to protect plants from frost and freezing temperatures when a cold arctic storm front moves through. But more commonly, the first fall freeze occurs on a clear, calm night when air temperatures simply drop below freezing. No storm or gusty winds. Under these conditions, the garden's soil surface cools quickly since there is no cloud layer to hold warm air close to the ground. The soil's heat is lost to the air above and cold air develops near the ground. This layer of cold air closest to the ground causes damaging frost on your plants. This is called an advective freeze.

### Understanding Freeze Damage in the Landscape

Seeing frost on plants in the morning is an indication temperatures have gotten cold enough during the night to cause water to freeze. The frost itself on plant surfaces does little



damage, but freezing of water inside the plant can cause significant damage. Think of what happens when pipes freeze in a house. Cell walls are collapsed as water between plant cells freezes.

The most important factors in plant damage are 1) how cold temperatures got, and 2) how long did temperatures stay below freezing. Low temperatures that persist for longer periods of time cause the most damage.

### Preventing Frost Damage

Cold air from an advective freeze moves to the lowest areas of the landscape and "pools" there. This makes plants in low areas more susceptible to freeze damage than those in higher areas. When frost is forecast, concentrate your efforts on the warm-season plants or crops you want to save that will be injured by cold temperatures.

If you still have produce in the vegetable garden, consider the cold hardiness of these crops.

#### Very hardy

Can withstand freezing temperatures and hard frost (less than 28° F) for short periods without injury.

Asparagus, collards, endive, kale, kohlrabi, lettuce, mustard, pea, potato, rhubarb, rutabaga, salsify, spinach, turnip

#### Frost tolerant

Can withstand light frosts (32-28° F) without injury.

Beet, broccoli, Brussels sprout, cabbage, carrot, cauliflower, celeriac, celery, chard, Chinese cabbage, Jerusalem artichoke, onion, parsnip, radish

#### Tender

Injury or killed by frost (32° F).

Snap bean, sweet corn, tomato

#### Warm loving

Cannot tolerate cold temperatures.

Lima bean, cucumber, eggplant, muskmelon, okra, pepper, pumpkin, summer squash, winter squash, sweet potato watermelon

#### Providing Frost Protection

A. Cover plants - Low-growing crops such as cucumbers and prostrate tomatoes are easy to cover with straw, newspapers or old bed sheets. Caged tomatoes and pepper and eggplant plants can be covered with paper grocery sacks or plastic trash bags.

The aim of covering plants is to trap heat from the soil in the air immediately around plants. It's important to uncover them the next morning, especially if you used plastic to fend off the frost. Plastic will trap the sun's heat the next day and plants may cook.



# EXTENSION

Cass County | 8400 144<sup>th</sup> Street, Suite 100 | Weeping Water, NE 68463 | 402-267-2205 | <http://cass.unl.edu>



B. Finish your harvest before frost comes - Harvesting when frost threatens is another option. Whether you rush to pick your produce before frost depends largely on the crop, how you intend to use it and how soon you can use it if it does get frosted.

Winter squash and pumpkins intended for storage should be harvested before frost because frost will damage their rinds and shorten their storage life. If they do get frosted, harvest them within a day or two and cook, freeze or can them immediately.

Green tomatoes picked before frost can be stored at 50 to 55 degrees F and ripened for weeks. Those picked after frost will not ripen or keep long, however.

Pepper plants turn black with frost and the fruits quickly turn mushy and rot. If you can't cover the plants, pick the peppers before frost.

Though bean plants are killed by frost or a hard freeze, the pods do not show damage right away. Pick and use them as soon as possible, however, for a quality product.

Summer squash plants wilt dramatically and fruits deteriorate quickly after freezing or frost. Pick summer squash before frost.

The cole crops -- broccoli, cabbage, Chinese cabbage, cauliflower and Brussels sprouts -- will tolerate quite a bit of frost. Though a really hard freeze will reduce the keeping quality of even these hardy vegetables, it's not necessary to rush to cover or harvest them when frost threatens.

Your Suggestions are Welcome!

Is there a lawn and gardening topic you would like to learn more about? Sarah Browning is an Extension Educator with Nebraska Extension and can be contacted by phone at (402) 441-7180; by mail at 444 Cherrycreek Road, Lincoln, NE 68528; or by e-mail at [sbrowning2@unl.edu](mailto:sbrowning2@unl.edu).



Sarah Browning  
Extension Educator  
Nebraska Extension  
In Lancaster County  
444 Cherrycreek Rd, Ste A, Lincoln, 68528-1591  
[402 441 7180](tel:4024417180)