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Frost Facts

by Michelle Le Strange, Master Gardener Advisor

We can't change winter weather, but we can protect our favorite garden plants from winter frost damage.

Understanding cold weather

The sun warms the earth's surface during the day and the heat is radiated back into the atmosphere during the night. The coldest temperatures occur about daybreak.
Clouds at night absorb and reflect heat back to the earth.
Calm, clear nights pose the greatest danger of frost, since there is no wind to mix the ascending warm air with the descending cold air and no clouds to radiate heat back to the soil.
Humidity slows temperature change in the air.
Cold air settles downward, flowing like water, to the lowest point. Hot air rises.
Cold wind compounds temperature loss.
How does frost occur?

Frosts occur on still, clear nights. Heat from the ground radiates to the sky, and the surface gets colder and colder. When the surface reaches the freezing point, the layer of water vapor in contact with the surface freezes into ice.

How plants respond to cold weather

The effects of cold temperatures vary with plant species, growth stage, age, general health, and water content. Young, actively growing, flowering, and dehydrated plants are more vulnerable.
Tender plants have a low tolerance of freezing temperatures. Tropical and subtropical plants fall into this category.
Hardy plants resist or tolerate freezing temperatures (as in "hardy to -20° F).
Cold temperatures and short day length slow plant growth and cause dormancy, making plants less susceptible to frost damage.
Frost injury occurs when ice crystals form on the leaf surface and draw moisture from (dehydrate) the leaf tissue.
The lower the temperature, the longer the exposure, and the faster the temperature drops, the greater the damage to the plant.

Plants always killed by frost include summer annual flowers and vegetables like impatiens, marigolds, coleus, tomatoes and peppers. Many herbaceous perennial plants will die back, but their roots and storage organs will survive the winter and growth will resume in spring.

Prevent frost damage

Start by selecting frost tolerant plants. Choose the best sites in your garden for sensitive plants. Plants on the south or the west have the greatest opportunity to absorb heat and light during the day and reradiate it at night, however south and east exposures warm up earliest in the morning. Plants in the open are more exposed and susceptible to damage than if they were planted next to a warm wall. Full sun is warmer than shaded locations. Loose mulches and cultivated soils are less insulating than bare, firm moist soil because there is more air space that loses heat more quickly.

How to protect plants from frost

Protecting plants from frost damage usually is accomplished by trapping the heat that is radiating from the ground with clear plastic, by moving the plant to a sheltered location, or by directly providing heat via light bulbs. Each measure gives about 2-3 degrees of protection. Keep plants well watered to thwart the desiccation of frost.

Mimic citrus growers

Deciduous orchards often have cover crops and weeds growing around the dormant trees, but citrus growers keep their orchard floors weed-free and well-watered in winter because it gives them a couple of degrees of warmth. During the day, the bare soil absorbs more heat than one covered with plants or weeds, and in the evening the radiated heat keeps the air around the trees warmer. This protects the trees from frost for a few more hours each night.

Get ready

If an unexpected light frost catches you unprepared, simply drape a plastic tarp, blanket, or newspapers over plants before nightfall to trap the heat. If you're prepared, you'll drape the cover over stakes or wire cages so that it doesn't touch the plant leaves. Leaves touching the covers are likely to be frost damaged. 100-watt electric light bulbs, in an approved outdoor fixture, can provide supplemental heat to covered plants. Be sure to hang them below the foliage, allowing the heat they generate to rise. Take care that the bulb is not so close to the trunk or a branch or the cover so that it could burn.

Some plants love winter. Pansies, violas, snapdragons, Iceland poppies, cyclamen, stock, flowering kale, and more provide color in our gray months and can be planted all winter long.

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