

Protecting Plants from Cold Temperatures

Although we live in the South, winter sometimes brings cold temperatures that can cause severe damage to many of our landscape plants. Thus, it is important to protect plants from these cold temperatures.

Temperature Changes and Plant Damage

A plant's ability to withstand cold temperatures depends on temperature fluctuations, or changes. When temperatures gradually decrease, a plant can acclimate, or adjust itself, to withstand colder temperatures better. Sudden decreases in temperature cause more damage in fall or early winter than similar low temperatures well into winter. If temperatures increase during the winter months, some plants may break dormancy, or deacclimate, and begin leafing out or flowering. Plants that break bud dormancy become more susceptible to cold injury because of their new, tender growth.

Cold injury can occur to all parts of the plant (fruit, leaves, stems, trunks, roots, and buds). Fruits and roots are the least tolerant of cold injury because they have little ability to adjust or build up tolerance to colder temperatures. Leaf and stem tissues are injured and damaged when ice forms within the plant's cells; this typically occurs during a rapid freeze. When this happens, the plant's tissue dies and is often

characterized by plant parts turning brown and mushy. When the temperature drops slowly, ice sometimes forms between the walls of the plant's cells. Hardy or cold-acclimated plants can often withstand this type of ice formation.

Windy conditions can also cause plant damage by desiccation, or the drying out of the plant. Marginal, or leaf-tip, burn or totally brown leaves in severe cases characterize desiccation. Desiccation occurs when a plant loses more water than it absorbs, or takes up, by the roots, especially when the ground is frozen.

Preventive Measures

Homeowners in Mississippi can enjoy a wide variety of plant materials. They can increase their choice of available plants by assessing and maintaining plant needs and by carefully selecting plants and site locations. By planting a combination of tender and hardy plants and by protecting plants susceptible to cold temperatures, homeowners can have landscapes that survive cold temperatures.

Protecting Plants from Cold Temperatures

Plant and Site Selection

The best way to prevent cold injury to plants is to choose plants that tolerate the cold temperatures in your area. Mississippi is in the USDA

Cold Hardiness Zones 7 and 8. Upper regions of Mississippi are in Zone 7A, which means that plants need to be hardy to 0 to 15 °F. North and north central regions of Mississippi are in Zone 7 B (5 to 10 °F); central Mississippi is in Zone 8A (10 to 15 °F); and the coastal portion of Mississippi is in Zone 8B (15 to 20 °F). Select plants that meet the minimum cold-hardy requirements in your area; for example, if you live in Zone 7, choose plants that are hardy to Zone 6 to ensure they will withstand the cold temperatures in your area. When selecting cold-tolerant plants, make sure that these plants also tolerate your area's summer temperatures.

In addition to proper plant selection, proper site selection is essential. Assess your property to determine the location of the coldest and the warmest spots. During the winter, the coldest spots are often found on the north and northwest part of the property and in low areas where cold air settles. The warmest spots are usually on the southern part of the property.

Assessing the microclimates of your property is also important. Elevation, landform, soil properties, canopy cover, and proximity of structures or other plants determine a microclimate. Microclimates can be used to help protect plants by placing cold-sensitive plants near the part of the house that receives southern exposure or near larger plants or other structures.

Plant Nutrition

Maintaining proper plant nutrition also helps protect your plants from cold damage. Proper nutrition of plants is critical: A plant that has been given the appropriate nutrition tolerates cold temperatures, withstands sudden temperature drops, and recovers from cold damage better than plants that are nutritionally deficient.

Fertilizing plants at the proper time of year is also vital. Fertilizing plants in the fall (after August or September) with a fertilizer high in nitrogen can result in a flush of new growth that is more susceptible to cold temperatures.

During the fall and winter months, most plants enter a dormant period when they need less fertilization. Winterizing-formulated fertilizers, which are high in potassium and low in nitrogen, may be used.

Canopies and Shade

Tree canopies can reduce cold injury from radiational freezes. Radiational freezes occur on calm, clear nights when temperatures drop because of radiational cooling or heat loss from the earth and from the surfaces of objects. Canopies help reduce radiant heat loss from the ground to the atmosphere by raising the minimum night temperature beneath them.

Plants that grow in shaded areas are less susceptible to winter desiccation, or drying out, than plants that grow in full sun. However, plants that prefer full sun do not do well in the shade and will be unhealthy and less tolerant of cold temperatures if they are planted in the shade.

Windbreaks

Windbreaks such as fences, buildings, and temporary coverings can help protect plants from cold injury. Windbreaks are most useful in reducing injury resulting from cold winds and advective freezes (freezes that occur when temperatures drop because of the invasion of cold air masses into the area).

Covering and Heating

Protect plants that are in containers either by placing them inside a protective structure (house, garage, greenhouse, or shed) or by placing a protective covering over them. Container plants are especially susceptible to cold temperatures; their roots are more exposed because they are above ground. Roots that are damaged by cold temperatures may not show immediate signs of damage; however, these plants will show signs of stress when temperatures increase.

Push together container plants that are left outside and mulch or cover them to decrease heat loss from the sides of the containers. Wrap the base of the containers in plastic, burlap, or blankets to reduce heat loss.

Plants that grow close to the ground are usually protected by heat radiating from the soil. Plants that are tall and more open do not receive this radiating heat and are not protected from the cold.

Remember to mulch the soil. Mulching protects the roots of plants and helps reduce

heat loss, thus minimizing temperature fluctuations. As with shrubs and trees, protecting the roots of perennials is necessary for them to survive the cold and come back in the spring.

Covering your plants helps protect them from frost as well as from extremely cold temperatures. Covers that reach the ground and do not come in contact with foliage help reduce radiant heat loss. To prevent foliage breakage, avoid having the covers (sheets, blankets) touch the foliage.

When extremely cold temperatures are predicted, place a light bulb (60 watt is sufficient) or other heat source under the cover to provide heat. Be very careful when using a bulb or other heat source, which can be a potential fire hazard. Do not let the bulb or heat source come in contact with the plant or the cover. Remove the cover and provide ventilation during the day to allow for the release of the heat that is trapped by solar radiation. This precaution is critical when using plastic covers.

Water Needs

Before a Freeze

Watering plants before a freeze can help protect them from cold injury. Soil that is well watered absorbs more heat and then reradiates heat, helping to increase the elevated temperature around the plants. However, poorly drained soils result in plants that have weak and shallow roots, which are more susceptible to cold injury.

To help plants prevent the loss of soil moisture, mulch the soil.

During a Freeze

Cold weather can also cause the ground to freeze. When this occurs, water is unavailable to roots; plants continue to transpire (lose water from their leaves) and dry out. Watering the soil to thaw the ground makes water available to roots.

Plants can be protected during a freeze by sprinkling them with water. Sprinkling helps keep the temperatures of the leaf surface near 32 °F. Sprinkling helps protect plants by using latent heat, which is released when water changes from a liquid to a solid state. To protect plants with this method, sprinkle when freezing

temperatures are reached and continue until thawing is completed.

Evenly distribute water over the plants and supply enough to maintain a film of liquid water on the foliage surfaces. The disadvantage is that if sprinkling is carried out for several days, the soil may become too saturated and may damage root systems or cause plant damage resulting from ice buildup.

After a Freeze

Check the water needs of plants after a freeze. After very cold temperatures, water that is in the soil may still be frozen and unavailable to the roots. If plants are transpiring (losing water from their leaves) and water is unavailable to the roots, plants may dry out. To provide water for plants, apply water to thaw the soil and the ice.

Pruning

Pruning in late summer or early fall can result in new growth that is more susceptible to cold injury; so avoid pruning at this time of year.

Wait to prune plants until new growth appears in late winter or early spring. Waiting to prune after freezes have past will guard against removing living wood. Injured plants may not break bud in the spring and may take on an overall weak appearance. Branch tips are more likely to suffer cold injury than older wood.

To determine if wood has been injured by the cold, check the cambium layer (layer directly under the bark) for black or brown discoloration. Prune this wood below the discoloration.

To determine if your fruit plants have been damaged by the cold, wait several days after a freeze and remove several flower buds from the plants. Use a sharp knife or razor blade to cut a cross section of the bud's top. If there is any discoloration in the bud, the bud has been damaged and will not produce fruit. Damage may be localized, however, and not all buds may have been damaged.

Summary

Healthy plants are more resistant to cold injury than plants that are weakened by disease, by insect damage, or by improper care.

