



## Preparing Nursery Crops for Unusually Cold Temperatures

Although winter comes every year, extreme temperatures can cause stresses that require additional preparation. Unlike greenhouse crops, which can be protected by environmental controls, field and container-grown nursery crops are more vulnerable to the impact of low temperatures.

### Threats from unusually cold temperatures include:

- Cold damage to above-ground plant tissues such as leaves and stems.
- Cold damage to root systems, especially for container-grown plants.
- Desiccation of plant tissue due to wind or prolonged cold temperatures when the root system and substrate remain frozen, preventing movement of water into the plant.
- Damage to infrastructure such as irrigation pipes, limiting the ability to water plants.
- Damage to structures such as hoop houses and plastic coverings from snow and/or ice.
- Disease symptoms caused by pathogens such as *Botrytis* that thrive in periods of prolonged leaf wetness and reduced airflow.
- Opportunistic pathogens such as *Volutella* that can infect tissues damaged by cold.

### In preparation for cold temperatures:

- When possible, move plants into covered structures, such as hoop houses covered with opaque plastic.
- Use frost blankets or plastic coverings for plants in outdoor beds. Additional covers also can be used inside hoop houses to trap the radiant heat from the ground closer to the plants.
- Irrigate thoroughly to ensure plentiful available water, especially for evergreen plants that may continue to lose water through transpiration, even during the cold. Moisture in the substrate will give off heat as it freezes and will form an insulating layer of ice around plant roots, protecting them from temperature fluctuations.
- For broadleaf evergreen plants, consider a spray application of an anti-transpirant to reduce water loss in prolonged periods of cold or high winds.
- Consider preventative application of a broad-spectrum fungicide, such as Artavia™ 2 SC or Dornic™ 720 F, prior to covering plants with plastic to limit the risk of damage from *Botrytis*.

### After the cold weather passes:

- Leave snow or ice on plants undisturbed unless it poses a structural threat. Allow it to melt naturally. It will continue to insulate plants and protect them from the added stress of freeze/thaw cycles.
- Check substrate moisture and irrigate as needed as soon as practical.
- Monitor plants for delayed signs of cold damage. Often plants will not show the full extent of damage until they begin to break dormancy in spring.
- Prune damaged tissues from plants where practical to prevent infection by secondary pathogens such as *Volutella*. Follow pruning with a preventative fungicide such as Dornic™ 720 F.

## Root killing temperature\* of select woody ornamentals

Roots of plants tend to be more sensitive to cold damage than the leaves and stems. This is especially true for containerized plants, which experience colder substrate temperatures and more extreme temperature fluctuations than in-ground plants. The table below shows the temperature at which more than 50% of the root system was killed in container-grown plants, resulting in reduced above-ground growth for some common nursery crops.

Scientific Name	°F
<i>Magnolia soulangiana</i>	23
<i>Magnolia stellata</i>	23
<i>Cornus florida</i>	20
<i>Daphne cneorum</i>	20
<i>Ilex crenata</i> 'Convexa'	20
<i>Ilex opaca</i>	20
<i>Pyracantha coccinea</i>	18
<i>Cryptomeria japonica</i>	16
<i>Cotoneaster horizontalis</i>	15
<i>Viburnum carlesii</i>	15
<i>Cytisus praecox</i>	15
<i>Buxus sempervirens</i>	15
<i>Ilex glabra</i>	15
<i>Euonymus fortunei</i> 'Argenteo-marginata'	15
<i>Pachysandra terminalis</i>	15
<i>Vinca minor</i>	15
<i>Pieris japonica</i> 'Compacta'	15
<i>Acer palmatum</i> 'Atropurpureum'	14
<i>Taxus x media</i> 'Nigra'	10
<i>Rhododendron</i> 'Gibraltar'	10
<i>Rhododendron</i> 'Hinodegiri'	10
<i>Pieris japonica</i>	10
<i>Leucothoe fontanesiana</i>	5
<i>Euonymus fortunei</i> 'Colorata'	5
<i>Juniperus horizontalis</i> 'Plumosa'	0
<i>Rhododendron catawbiense</i>	-10
<i>Rhododendron</i> 'PJM'	-10
<i>Potentilla fruticosa</i>	-10
<i>Picea glauca</i>	-10
<i>Picea omorika</i>	-10

\*Highest temperature that killed more than 50% of root system and reduced top growth

Source: Havis, J.R. 1964. Root hardiness of woody ornamentals. HortScience 11(4):385-386