

# Garden practice Understanding FROST

Most gardeners in Britain can expect freezing conditions, so ensure your prized plants are protected

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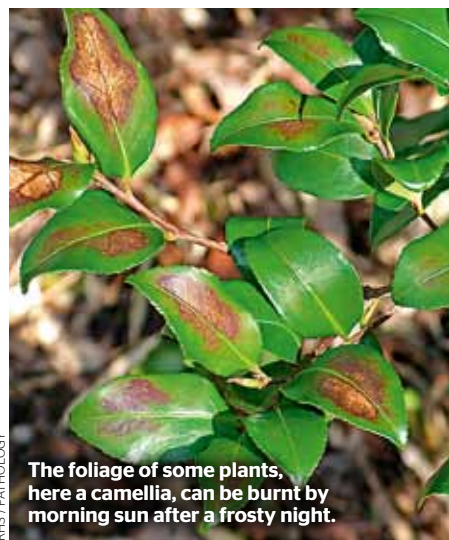
GAP PHOTOS / JON EVANS

*When the first* frost of autumn dusts itself over our gardens, we have no choice but to accept winter is arriving. Frost is frozen water that forms when temperatures fall below 0°C (32°F). Clear skies and still conditions will turn moisture such as dew into ice crystals. A light frost can be as little as -1°C (30°F) whereas a severe frost can send temperatures plunging to -12°C (10°F) or lower.

The first frosts are typically encountered from September to November, depending on locality and local geography. Coastal districts experience milder winter temperatures due to the warming effect of the sea. Inland areas often encounter earlier frosts and experience more severe winter weather. Many New Zealand plants such as *Olearia* or *Cordyline* are suited to British coastal climates, but tend to struggle in colder, inland areas. By contrast, the last frosts of winter can be as early as April in milder districts, or as late as June inland.

Frost manifests itself in several forms, all having similar effects on our garden plants. Air frosts are typical in autumn when the ground retains heat, but the air above ground level freezes. Foliage may be damaged but plants are not always killed outright. In contrast, ground frosts occur when the ground level freezes. Frosts are common during periods of high pressure when skies are clear with sunny days but cold nights.

The frost that sends many of us running for our cameras is hoar (or radiation) frost, with its white, often needle-shaped crystals typically formed when the air is humid. While this may look to have damaging weight implications, it is usually short lived and recedes in the morning sun.



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The foliage of some plants, here a camellia, can be burnt by morning sun after a frosty night.



GAP PHOTOS / DAVE BEVAN

Rhododendron flowers are vulnerable to frost damage.

## Frost damage in autumn

Plants are damaged by frost as the water inside the plant cells freezes, rupturing cell walls. Some hardy plants react to cold weather by lowering the freezing point of their cell contents, whereas others, such as birches, simply drain much of the moisture from their cells during winter months, rehydrating in spring.

Try not to cause hardy plants any physical stress when frosted. Walking on frozen grass is a fine example of this; defrosted lawns show blackened footprints which is the result of damaged cells.

Autumn is an essential time for plants to shut down, allowing wood to ripen after growth ceases in late summer. A sudden severe frost can damage poorly ripened wood (which can still be soft and sappy) even on hardy plants, often resulting in stem dieback. A warm autumn may produce a late flush of growth on plants such as *Eucalyptus*, which is more prone to damage if followed by a sudden cold snap, as experienced in 2010. In cool coastal areas, there may be insufficient summer heat for wood to fully ripen, and repetitive dieback can occur each winter, making plants such as *Magnolia grandiflora* difficult to grow. Planting against a warm south wall will help to remedy this.

## Spring damage

Plants starting to wake up for the season ahead can be affected by late spring frosts, typically to breaking buds, young leaves and flowers. Magnolia flowers are readily spoiled by frost, turning brown and limp – though petals emerging from frosted buds are usually unaffected. A severe spring frost

can kill some plants outright: *Prunus mume* is a prime example, though damage to emerging hydrangea shoots, apple blossom or vegetable seedlings is more often seen.

Vulnerable material should be covered with a double layer of horticultural fleece where possible. Hardy plants might display a delay in leaf production, an abortion of fruit or stem-tip dieback. Young foliage can show yellowing, virus-like mottling or blackened margins as a result of early cold damage, though hardy plants will grow through this healthily as temperatures improve.

## Surviving frosts

The coldest period of the day is often just after dawn; frozen plant material can be damaged by rapid warming as the sun rises, not allowing the plants to adapt to the changing conditions. Use fleece to protect the flowers of shrubs such as *Camellia* from early morning sun, or site plants in the shelter of other trees and shrubs or against a wall that is not east facing.

Prolonged periods of frost prove more damaging than short spells of subzero conditions, and given most plants are in an inactive state due to the low light levels and temperatures, they are ill equipped to recover from this stress. The survival of a plant in a half-dead state by late January/early February can often depend on the early onset of spring bringing much needed warmth. A plant which has not shown signs of recovery or produced leaves by midsummer should be presumed dead. ●

**More from the RHS** For more on preventing frost damage enter 'Frost' in the search box at [www.rhs.org.uk](http://www.rhs.org.uk)

## Gardening in frosty weather

- ❖ Firm in new plantings that have lifted from the soil after a period of frost, due to soil water expanding as it freezes.
- ❖ **When preparing vegetable beds or new planting areas, dig heavy clay soil in the autumn, leaving the clods of earth to be shattered apart by frost.**
- ❖ Delay cutting back perennials and grasses until spring; collapsed plant material will protect new shoots.
- ❖ **The rootballs of plants in pots are susceptible to freezing; wrap the pots in bubble wrap (inset) or shelter them in a garage or porch.**
- ❖ Remember to water potted evergreens during milder spells: freezing weather can restrict uptake of water, which is still required in winter.
- ❖ **In spring, when frost is forecast, cover new plantings – and established plants with new shoots known to be vulnerable to damage – with a double layer of horticultural fleece (below).**
- ❖ Cover small fruit trees and bushes with fleece overnight to protect buds and flowers from late spring frosts; remove by day to give pollinators access. Cloches can also be used to protect strawberry plants.
- ❖ **If gardening on a slope, avoid creating frost pockets. Cold air flows to the lowest point, so avoid blocking a slope with a fence or dense hedge. Instead, allow spaces for frost to 'drain' or 'roll' away.**



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IAN CURRIE

## Monitoring temperatures to predict frost

Ian Currie, Fellow of the Royal Meteorological Society, columnist and editor of *Weather Eye* magazine

Air temperatures are measured at the standard height of 1.25m (4ft). A thermometer placed over short mown grass will often show lower temperatures than at the standard height on a clear, calm night. Hence if the weather forecast predicts a minimum air temperature of, say, 3°C (37°F) this could well be down to -1°C (30°F) at plant level close to or on the soil surface: so-called 'ground' or 'grass frost'. On a breezy or cloudy night there is much less of a difference.

The nature of the soil is another factor influencing the frequency and severity of a

frost, with sandy soils losing heat to the air more rapidly and hence reaching colder surface temperatures than a clay soil. All soils will lose less heat if they are moist and so reduce the severity of the frost.

### DIY forecasts

In cool, stable air with the air pressure rising and the likelihood of a clear, still night to follow, you can predict whether a frost is possible. Mount an outside thermometer in the shade, preferably facing northeast, and set at 1.25m (4ft) above the ground. Note the temperature around 2pm and again around

7pm. Double the temperature at 7pm then subtract the 2pm reading. For example, if you measured 14°C (57°F) at 2pm and 8°C (46°F) in the evening, twice the later value is 16 (32) so the predicted dawn reading would be 16-14 (92-57) = 2°C (35°F) and a ground frost may be quite likely. Expressed as an equation:

$$\text{Predicted dawn temperature} = 2y - x$$

where  $x$  is temperature at 2pm,  
and  $y$  is temperature at 7pm.

These values are for the air temperature, and you will need to take off several degrees to forecast the minimum ground temperature.