

Why Some Trees Keep Their Leaves

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How wonderful to walk on a cold, crisp winter day and listen to the leaves rattling in the trees. Wait, what? Leaves rattling in the winter? How can that be?

In autumn, at the base of each tree's leafstalk (petiole), a layer of cells called the abscission layer slowly closes off the xylem vessels that carry nutrients to the leaf. This prompts the tree to put on a show over several weeks in a range of colors. When the abscission layer is complete, the petiole breaks easily, and the leaf falls off the tree.



However, some tree species change color but the leaves do not fall. Instead, the trees retain some or all their leaves over the winter. The

abscission layer in these trees completes its formation in the spring and then leaves fall. This is called marcescence, defined as withering and retention of dead plant matter normally shed by a plant. Most often, it refers to plant leaves and most obviously is seen in deciduous trees. Varieties of oak (*Quercus*), beech (*Fagus*), witch-hazel (*Hammamelis*), hornbeam (*Carpinus*) and willow (*Salix*) all show marcescence under normal conditions. Other trees may have marcescent leaves when an early freeze kills the leaves before the abscission layer completes development. Pests or disease can also kill leaves before the abscission layer is complete.

No scientific research has explained why marcescence occurs, but there are theories. Perhaps, the leaves protect the new buds from frost and cold; the dead leaves may act as a deterrent to deer browse since dry leaves are noisy and make deer uneasy. Maybe, a tree ensures nutrients for the spring by having partially decomposed leaves land right at the tree base. It is also common to see older trees shed the upper leaves in the fall and retain only the lower leaves. In spring, expanding new buds push the dead leaves off, or the leaves may be retained indefinitely until wind or another force snaps the leaf petiole.

In the Northeast, a disadvantage of trees holding onto their leaves is snowfall. Trees with leaves, even dead ones, weighed down by snow risk limb breakage. Another disadvantage, but this one is for the tree owner, is that leaves have to be raked or cleaned up in spring as well as fall.

