

## Dieback and Decline

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The term “dieback” technically refers to the progressive death of twigs, shoots, and branches from the tip downward (Figure 1), while the term “decline” refers to the progressive deterioration of an entire tree (Figure 2). These terms, however, are often used interchangeably to denote the general deterioration of an individual tree, or entire species of trees.

Dieback/decline of individual trees is fairly common in the urban environment where a particular tree has been exposed to adverse environmental conditions. Under certain conditions, however, large-scale decline or dieback may affect a particular tree species in a given geographic area.

### Symptoms

Initial symptoms of general dieback/decline are often very difficult to detect to the casual observer. General reduction in growth, chlorotic foliage, slight twig mortality, premature fall coloration and defoliation, and abundant fruit and flower production often characterize the initial stages. As the disease progresses, the foliage becomes dwarfed and tufted at the ends of the twigs. Twig and branch mortality become more severe, and an overall thinning of the crown is evident.

Advanced stages are characterized by extensive branch mortality. Cankers are commonly evident on the branches as well as the main stem, and root and butt decay often occurs. Attack by insect borers may occur as well. Declining trees may linger for a seemingly indefinite period, or death may occur within just two or three years following the onset of symptoms.

### Cause

Dieback/decline is a disease complex, which cannot be attributed to any single factor. This disease complex most often occurs after trees are weakened by an initial stress factor. Although there are many factors which can cause this initial stress, root or soil disorders are

**Figure 1: Tree showing early stages of decline that typically starts in the upper canopy**



**Figure 2: Boxwood decline**



the most common causes. Some triggering disorders include girdling roots, competition from other plants, soil compaction, and changes in the depth of the water table, deicing salts leached into the root system, low soil nutrients, and inadequate or excessive soil moisture.

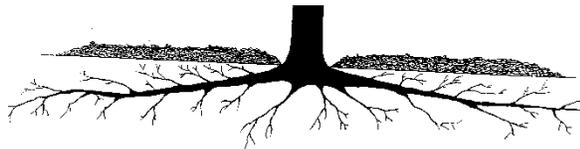
Other stress factors include repeated defoliation due to leaf-feeding insects or foliar pathogens, air pollution damage, misapplied pesticides and fertilizers, mechanical wounding from automobiles, lawn mowers, etc., and lightning strikes. Where the initial stress factor occurs over a large geographic area, an entire species may die back or decline.

Once the tree is sufficiently weakened, secondary fungal invaders or boring insects commonly attack the tree resulting in its death.

### Control

Dieback/decline can best be controlled through preventing the occurrence of the initial stress. Cultural practices including periodic fertilization, pruning, watering during dry periods, and control of leaf-feeding insects and foliar pathogens are essential in preventing the onset of the dieback/decline complex (Figures 3 and 4). Proper initial selection of plant species and planting sites, as well as strict adherence to correct planting techniques, are also primary considerations in preventing this condition.

**Figure 3: Proper mulching to the dripline is one cultural practice that both avoids and helps correct decline symptoms**



**Figure 4: Fertilizer application should be based on results of laboratory soil tests**



Control of dieback/decline is much more difficult once a tree is affected. The primary stress factors must first be determined and corrected. This is often complicated by the presence of secondary insects or fungal invaders, which are often mistakenly implicated as the primary cause of the problem.

Being aware of such factors as past weather conditions, activities in the area, and cultural practices performed on the tree are usually necessary in determining the initial stress factor. Once these factors have been determined, the cultural practices as outlined above should be carried out regularly.



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