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Conifer Dieback

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We have received a number of samples and phone calls regarding spruce trees and other conifers (including pine, arborvitae, and juniper) that are turning brown and appear to be dying.

The common symptom seems to be the "sudden" death of numerous branches, or even the entire tree. Often times, the needles completely drop off the branch without turning brown first (although some reports do indicate yellowing and browning of the needles first). In many cases, the needles deep within the body of the plant drop first, and the ends of the branches lose their needles last.

Many of the conifers are well-established and have been in the location for 5 to 50 years. Some reports are those of trees planted within the last 4-5 years, such that transplant shock could be a factor.

There appears to be no single consistent factor associated with this widespread decline other than the drought conditions of 2007 and the extreme temperature fluctuations last spring. It is highly likely that these stress factors are the primary cause of many of the discolored and dying 'evergreens'.

Symptoms observed on established conifers are similar to those that can be observed on a cut Christmas tree. Even after the tree is placed outside following the holiday season, the foliage remains green, sometimes for more than 5 months without a single functioning root. Only when warm temperatures arrive in late spring will the foliage on this cut tree start to lose moisture and turn brown. Once this process begins, the discoloration will continue to develop until the tree is completely brown and the foliage falls off the branches. But until a significant

portion of the crown turns brown, the casual observer may not notice the subtle change in needle color.

A similar scenario occurs in landscape conifers when roots or cambial tissue are damaged. The structure of the needles, and the waxes that coat the foliage, help to inhibit moisture loss and the foliage remains green. If the root damage occurs when temperatures are cool, then the foliage can appear healthy for several weeks or months after the roots have died. By the time the foliage begins to turn brown the roots may have been dead for weeks or months. Conifers often respond all at once when they reach some 'critical threshold' of stress. Frequently this is exacerbated by disturbances in the root area, drought or other environmental, site, or cultural problems. Injury to cambial tissue (tissue that transports food and water) on thin-barked trees may also have occurred this past spring when unseasonably high temperatures in March were followed in April by a sudden drop in temperature. Delayed symptom expression consisting of branch dieback and even tree death is likely a result, in part, of the tissue damage that occurred following this extreme temperature fluctuation.

One clue to determining if a browning evergreen will produce new growth is to check the buds at the tips of the branches - if they are green inside, then new growth may develop in the spring. If the buds on the ends of all branches are brown and dry, the tree will not recover.

That said, the other extreme, "wet feet" (poorly drained, waterlogged soils) is also damaging to spruce, pines, and many other conifers. Feeder roots 'drown' in anaerobic conditions during prolonged wet periods, especially in the spring. It is possible that death to feeder roots from excessive soil moisture could have started the domino effect that led up to our current rash of spruce die-offs.

Wet feet will also encourage root rot disease. Two of the most common root rot diseases are Pythium and Phytophthora Root Rots. These are caused by soil-borne fungal-like organisms. In dry, well-drained areas, the diseases have little or no effect; but in poorly drained soils, they easily infect the roots of susceptible species. There is no chemical cure or preventative for this.

Right now, there is not much we can do. As stated previously, if the entire branch is dead and there are no green buds on the branches, then those limbs are dead and should be removed. If the entire tree is brown, remove it quickly, before bark beetles and borers that may have been attracted to the dying tree move to infest nearby trees.

If there is still life within your tree the best option is to irrigate during drought stress periods during the growing season. PLEASE NOTE: The roots of all trees extend beyond the ends of the branches. Watering ONLY under the branches only provides water to maybe a quarter of the root system; if the non-watered roots die, your tree will likely exhibit decline. Supplemental water is especially important if there is competition for water from other nearby trees.