Spruce Problems are Widespread
by Bruce Fraedrich, Ph.D.

Norway and Colorado Blue Spruce samples are coming into the Bartlett Plant Diagnostic Clinic with browning and drop of the interior needles. Twig dieback has also been observed on samples, but less frequently. While some browning of interior needles is normal in the fall, the symptom appears to be more pronounced this year. Needle browning and subsequent drop can be indicative of needlecast diseases caused by *Rhizosphaera* sp., *Stigmina lautii*, and spruce needle drop (SNEED). However, in many cases no disease or insect pest is associated with symptoms observed on samples submitted to the clinic. The specific causal factor for this symptom is unknown, but abiotic stresses are suspected culprits. Spruce can undergo stress during extended periods of heat and drought to the point that needles are shed and sporadic dieback occurs. Spruce trees that exhibit these symptoms should have buried root collars exposed, be fertilized according to soil test report recommendations, and monitored carefully for pest invasion.

Bartlett Tree Experts
Explore the Benefits of Biochar
by Kelby Fite Ph.D.

A modern take on an ancient method of soil improvement has been shown to have an outstanding effect on tree survival rates – stemming the losses most landscapers have had to accept as inevitable and alleviating stress conditions, a known prerequisite to pest and disease attack.

Biochar is a form of charcoal used to improve soil nutrition and growing conditions. It can be made from woody biomass that has been heated and charred with a restricted supply of oxygen, a process called pyrolysis. It captures atmospheric carbon, locking it into the soil for hundreds of years.

Thanks to its microscopic honeycomb-like structure, biochar provides the perfect habitat for beneficial soil microorganisms, such as mycorrhizal fungi, to flourish. Biochar also acts like a sponge, lessening the risk of drought stress and reducing the frequency of irrigation. It helps to retain mineral nutrients that would otherwise be leached away by rain and does not decompose, staying in your soil for decades.

Knowledge of biochar has been around for millennia. Studies of soil at sites throughout the Amazon Basin suggest that ancient Amazonian civilizations made a primitive type of biochar and added it to the soil to help grow their crops.

It’s not just the ancient civilizations that recognized the potential of biochar. This year, Dr Glynn Percival, Plant Physiologist at Bartlett Tree Research Laboratory in the UK investigated the benefits of biochar on the health of transplanted trees. Biochar formulations were tested in the UK throughout the 2012/13 growing season. They found that with the addition of small percentages of biochar, tree health was vastly improved. Not only did 60% more transplanted trees survive; they displayed significantly increased photosynthetic efficiency, better growth, and a larger canopy area.

These trials followed three years of research here in the US where Bartlett scientists applied biochar to trees on urban street, suburban sites and other challenging soil environments, demonstrating the product’s effectiveness even in the harshest conditions.

Biochar is ideal for amending soils around existing trees, transplanting new trees and is suitable for all tree and shrub types. Its easy-to-apply formula promotes quick establishment and reduces losses; encouraging vigorous root growth and healthy soil biology.

Bartlett Tree Experts find positive results in investigation into the benefits of biochar for improving the health of transplanted trees.
The good news is that the vast majority of large trees are not at a high risk for failure. Even during hurricanes, only a small fraction (usually less than 5%) of the urban tree population falls down. However, arborists and most homeowners realize that trees are living organisms and at some point, all trees will structurally fail.

Within the past two years, there has been a major change in the way arborists conduct tree risk assessments and present the findings. This change has stemmed from the adoption of a new American National Standard (ANSI A300 part 9) on tree risk assessment and a new industry Best Management Practice (BMP) on tree risk assessment from the International Society of Arboriculture. The Bartlett Company has been at the forefront of both of these efforts and has provided training for Bartlett Arborist Representatives in the new methodology.

When an arborist inspects a tree, he/she looks for defects and conditions that could contribute to premature tree failure. This assessment may be a visual inspection or may include drilling to determine if there is excessive internal decay. In addition to looking at the tree, arborists also look at the site and people or structures that could be injured or damaged by a tree failure.

The BMP leads arborists to focus on the risk trees pose rather than just looking at the extent of tree defects. Three factors have been defined that go into a tree risk assessment:
- the likelihood of failure,
- the likelihood of the failed tree or branch impacting a person or structure, and
- the consequences of tree failure and impact.

These factors are combined to define risk.

If you have a tree that you are concerned about, contact your Bartlett Arborist Representative to discuss the need for a tree risk assessment.

**Assessing the Risk of Tree Failure**
*by Thomas Smiley Ph.D.*

When I think of early spring flowers the early white flowers of Amelanchier, Serviceberry always come to mind. This small, multi-stemmed, zones 4 to 9, tree usually begins to flower at the end of March into early April. This usually coincides with Easter church services, hence the common name Serviceberry. A cross between Amelanchier arborea and Amelanchier grandiflora, this is a true multiple season interest plant. It looks great in spring with its delicate white flowers followed by small finely toothed green leaves into the growing season. In early June the tree is usually festooned with small blueberry like fruit. It has outstanding fall color glowing orange to red and yellow. In the winter the silvery branches adds to its appeal giving a nice lacy texture. ‘Autumn Brilliance’ will reach a mature height of around 15 to 30 feet with a nice round spread. This plant grows best in moist well drained soil, yet is tolerant of less than ideal growing conditions in full sun to part shade. Amelanchier is sometimes troubled with rust issues; however ‘Autumn Brilliance’ is fairly resistant. It is a great natural looking plant suitable for most urban landscapes.

**Tree Focus—**

*‘Autumn Brilliance’ Serviceberry*

*by Gregory Paige Ph.D.*

Fungal fruiting bodies indicate that there is internal decay, which, if extensive, will increase the likelihood of tree failure.

High risk trees are likely to fall, likely to impact people or high value property, and may cause considerable damage.
Structural Pruning of Young Trees

by Bruce Fraedrich, Ph.D.

Most structural defects that occur in older trees can be prevented by pruning when the tree is young. This practice can avoid the need for more expensive tree care practices later in the life of the plant and can extend the lifespan of the tree by decreasing the likelihood of branch failures. Structural pruning of young, developing trees provides a desirable and stable form at maturity and is one of the best investments that consumers can make in their landscape.

Forest trees tend to develop a sound structure in response to competition. They grow in close proximity to other trees and the shade created by the developing forest canopy suppresses growth of lower limbs. Dominant forest trees tend to maintain a single stem and narrow crown as they grow toward light. This produces a reasonably strong structure in mature forest trees.

Conditions are radically different when trees are planted in the landscape. The tree is exposed to full sun, which encourages a broader, more complex crown than one growing in the forest. Lower branches may grow very large, limbs develop in close proximity to one another and multiple stems can develop. Certain species such as maple, elm, ash and dogwood are particularly prone to developing structural defects.

When trees are young, they grow rapidly. Frequent assessment is recommended to determine when pruning is needed to maintain a desirable structure and correct any deficiencies. On many species, pruning is needed every two-to-three years for the first ten-to-fifteen years after planting. Structural pruning focuses on maintaining a single dominant stem unless multiple stems are specifically desired as is frequently the case in some species such as birch and crapemyrtle. Branches are pruned so their size remains proportional to the stem diameter at their point of attachment. As trees grow, some branches are removed to ensure adequate spacing between permanent scaffold limbs. The shape of the tree is maintained to provide a natural open grown form typical of the species.

Tree Related Cryptogram

Code-breakers can decrypt the following message about trees.

“KJ KY ZKPPKQSMJ JC FVXMKIV UCR BFVXJ X EXFJ CP XMM JUXJ KY QUVVPSM XOZ ZVMKBUJPSM KO JUV FVQCMVMVKCOY CP CSF CRO MKPV KY XYYCQXXVZ RKJU JFVVY.”

– Wilson Flagg

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Early Spring Pests of Trees and Shrubs by Don Booth, Ph.D.

Early spring is a critical time for landscape plants. This is when they break dormancy, the sap begins to flow, and the first pest problems appear. For deciduous plants, they must use sugar stored in the roots to produce new leaves. The first flush of foliage is critical, because the plant needs to replenish its energy reserves. Unfortunately, this is also a time when the plant’s defenses are lowered and it is easy for pests to attack.

The following are just a few of the common landscape pests of early spring:

**Tent Caterpillars:** Several common species eat the buds, young foliage, and flowers of cherries, crabapples, oaks, and other trees. Defoliated plants may eventually recover, but may have reduced blooming the following year.

**Spider Mites:** As soon as spring arrives, the eggs of several types of mites hatch. If not controlled, mites can quickly damage a wide range of plants, including laurels, pines, hemlocks, and junipers.

**Ambrosia Beetles:** In recent years, many exotic tree-killing species have become established in North America. Early spring is a critical time to protect trees from these borers.

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