



Saving Our Sugar Maples

SEARCHING FOR TOUGH SURVIVORS TO CLONE

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Have you noticed the poor condition of sugar maples in towns and cities and along Ontario's roadsides? Many have dead limbs. For some, half the tree is gone. Why? You may hear some saying they are simply old trees that have lived their best days. Well, the truth is that most roadside sugar maples are only about 80 to 90 years-old, which isn't old for this species. Healthy sugar maples can live 300, some say even 500 years.

One of the major reasons for sugar maple decline, in health and numbers, is pollution, including salt, carbon monoxide and other airborne pollutants from vehicles. Another reason for their poor health is direct physical damage from root-pruning during excavations, when clearing out ditches, and when tillage extends under their canopies. Sugar maples have up to 90% of their roots within the top 10 cm of soil so whenever plowing, ditching or other excavations occur, the roots are cut. With frequent disturbances to their root systems, a portion of the trees' ability to take up nutrients and water is jeopardized. Soil compaction is another problem along

roads, lanes and in parks. Compact soil is poorly aerated, prevents percolation of water to roots, and inhibits the activities of soil animals that are so important in fertility and nutrient cycling.

The Value of a Maple

Sugar maples are not doing well in our changing urban and roadside environments where they are valued highly for their shade and beauty. Other trees could fill their niche, so why is there such concern about this particular roadside tree? The reason is clear – the problems exhibited by roadside sugar maples are a reflection of what is going on in our natural forests. On a broad environmental scale, pollution

is impacting complete ecosystems. On a more localized economic scale, Canada is a world leader in maple syrup production. Finally, even the trees growing outside forest stands and sugar bushes are important to the economy in many ways. Think about how many places cash in on their vibrant fall colour displays. Sugar maples are a quintessential Canadian icon.

Searching for Survivors

So what are we doing about it? Well, first we have been looking for, and identifying, sugar maples that are surviving the environmental stresses that have confronted them for a good many years. These trees are all older than 80 years and are



growing on roadsides exposed to road salt and car exhaust. They are the survivors as many others in the same age bracket have already died from these various stresses. Can we propagate tough trees from them? We have designated potential “selected parent trees” as those survivors that have a single stem or trunk and have an even, healthy-looking crown.

Using the selected trees, we are developing ways to clone them by rooting some

of their twigs. Typically, twig cuttings from younger trees will root when treated with rooting hormones and placed into moist soil. But twig cuttings from older sugar maple trees, our potential parents, we found after much work, do not respond to the treatments and fail to root. We have adopted “air layering” and some success has been achieved. We are now refining our experiments to find out where and how to air layer for best results.

Rooting in the Canopy

Air layering is a technique by which one places some peat moss, or other rooting material, around a twig that is still attached to the parent tree. Our twigs are those in the canopy and a mobile lift is needed to reach them (Figure 1). The soil is held in place in a plastic sheath (Figure 2). The cells in the bark respond to the soil and start the process of creating roots. Usually after 6 to 8 weeks, roots grow into the peat moss within the plastic sheath (Figure 3). Once the roots are established, the twig off is cut off, unwrapped, and can be planted. The result is an exact genetic copy of the parent tree, and many can be obtained from a single parent. Now that we

have had some success in obtaining clones from selected, tough parents, the project can proceed.

Once we have enough clonal material (air-layered twigs or ortets) from a good number of parent trees growing and overwintering as nursery stock, they will be grown for several years until they start to flower. Once they start to flower, controlled pollinations will be used to produce “plus” seeds carrying the genes from both tough old parents. It is these seeds, resistant to pollution and stress, that will be grown in open conditions for restoration of roadside sugar maple avenues, for hor

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Photo Captions

Adjacent Page Main Pic: Air layering of sugar maple. Inset: New roots on an air layer after 10 weeks. This Page: Air layering in the upper canopy of sugar maple.