

Urban tree replacement costs reduced 10 times

BLACK MAPLE

John Klironomos et al.
University of Guelph, 2001.

OBJECTIVE

Evaluate the influence of soil compaction on tree growth and survival of black maples inoculated with *Glomus intraradices*.

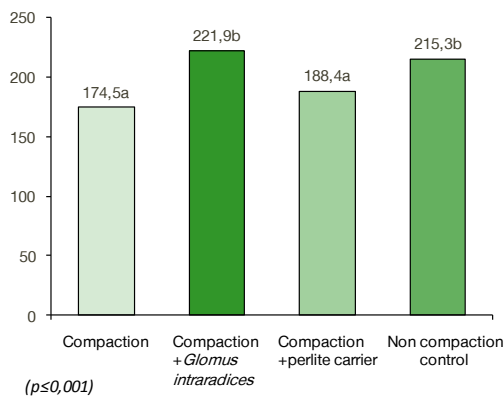
METHODS

A field experiment at the University of Guelph Arboretum, was initiated with the following four treatments: (1) soil compaction (bulk density 2.5 mg m⁻³), (2) soil compaction + mycorrhizal inoculant + perlite carrier, (3) soil compaction + carrier control, (4) non-compaction control (bulk density 1.8 mg m⁻³). Each experimental unit consisted of a 1m² portion of soil, with each a five-year old, pot-grown, black maple sapling. There were ten repetitions per treatment for a total of 40 experimental units. Plants were assessed for mycorrhizal colonization prior to planting. Roots were less than 10% colonized. To the inoculated treatments, a commercial mycorrhizal inoculum was added at the recommended rate. The compaction treatment was initiated 2 weeks after the trees were planted and was repeated once a week for the following four weeks. Compaction was applied manually by a 140 lb person who treated the 1x1 m area around each tree by walking around them 5 times with small steps while the soil was moist.

RESULTS

After one growing season, the plants did not appear to grow any taller under the various treatments. However, compaction did negatively impact the number of leaf days in the saplings. Leaf-fall was initiated sooner in the compaction treatment, but this was reversed with the addition of the mycorrhizal inoculant. By the end of the first growing season (1997), all saplings remained alive. But during the summers of 1998 and 1999, there were severe droughts in southern Ontario, and whereas all saplings survived the non-compaction treatment, only 1 untreated sapling survived the compaction treatment. The addition of mycorrhizal inoculant or of the perlite carrier increased survival under compaction, however the mycorrhizal inoculant was particularly effective (only one plant was lost). In the carrier treatment alone, less than half the plants survived after the second year of drought. By the end of the experiment there was still some residual carrier effect however, minimal compared to the significant effect of inoculation in the compaction treatments.

Effect of mycorrhizal inoculation on the leaf days



Effect of mycorrhizal inoculation on the black maple survival

