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Abstract. The evaluation of decayed wood in a tree is essential for tree risk assessment in arboriculture. It is not feasible in practice to measure the amount of wood decay in all the wood of every tree. Therefore, the capacity of a single measurement taken in cross-section to approximate the volume of decay in the wood of a whole tree is the focus of this study. The volume of wood decay in *Eucalyptus saligna* trees was estimated post harvest by measuring the whole tree wood density of 36 trees. Linear, logarithmic, and multiple regression statistical models were used to examine whether whole tree wood density data could be correlated with three ways of directly measuring wood decay in a single cross-section, two prior to tree felling and one post felling method. The decay estimation techniques were measured in cross-section—a Picus® Sonic Tomograph system, an IML-Resi system, and a visual method. In this study the Resi System for estimating wood decay showed a correlation with whole tree wood density in the entire tree whereas the Picus system and the visual method did not show any statistical correlation with whole tree wood density.

Key Words. Eucalypts; Hazard Trees; Picus® Sonic Tomograph; Resi; Resistograph; Tree Failure; Tree Risk Analysis; Wood Decay.

Wendy McWilliam, Paul Eagles, Mark Seasons, and Robert Brown

Assessing the Degradation Effects of Local Residents on Urban Forests in Ontario, Canada..... 253

Abstract. Urban forests provide essential social, ecological, and economic functions in support of their communities; however, surveys indicate adjacent residents conduct activities within their yards and the adjacent public forest edge that degrade these systems. Local governments rely on boundary-focused passive management and/or active management to limit impacts. Encroachment results from various boundary treatments; however, it is not known whether encroachment represents a substantial source of degradation within Ontario, Canada, municipal forests. To evaluate this, percentage cover of encroachment impacts adjacent to 186 homes within 40 forests of six Southern Ontario municipalities was surveyed. The results indicated degradation resulting from encroachment was substantial. Encroachment occurred in highly valued and sensitive ecosystems, and during sensitive time periods. This was highly prevalent and covered a substantial proportion of the forest edge. Some encroachment behaviors were particularly harmful, resulting in the loss of significant forest area to residential land uses. Furthermore, encroachments remained over long periods. The small sizes and convoluted shapes of urban forests leave them vulnerable to these impacts. Prevailing municipal strategies are insufficient to protect these systems from encroachment. To ensure their long term protection, municipalities and their communities need to substantially increase their commitment and resources for addressing encroachment.

Key Words. Adjacent Land Use; Green Infrastructure; Greenspaces; Planning and Management; Residential Encroachment; Urban Forest Ecosystems; Urban Forest Edges.

Henrik Sjöman, Anders Busse Nielsen, Stephan Pauleit, and Mats Olsson

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Abstract. Trees in urban paved environments are highly exposed to heat, low air humidity, periods of critical water stress, high soil lime content and soil pH, limited soil volume, pollutants, and de-icing salts. Combined with the challenges of climate change and the threat of disease and pest infestations, this has led to considerable and persistent arguments for using a more varied range of trees, including stress-tolerant species, at urban paved sites. Extensive fieldwork was carried out in the Qinling Mountains, China, in a search for tree species suitable for urban paved sites in northern parts of central Europe and in adjoining milder parts of northern Europe (CNE-region), where tree species are exposed to seasonally dry and harsh conditions. The study identified habitats in the Qinling Mountain range that are similar to those at sites in paved environments, and analyzed the growth and performance of different tree species in these habitats. A total of 25 tree species representing 21 genera were found, of which 14 species were identified as specialist colonizers of warm, dry south-facing slopes where site conditions are similar to those in paved environments of the CNE-region.

Key Words: Habitat Studies; Selection; Site-Adapted Species Use; Urban Paved Sites; Woody Species.

Timothy K. Broschat and Joseph J. Doccola

Effects of Soil-Applied and Trunk and Petiole-Injected Manganese on Manganese Content of Coconut Palm (*Cocos nucifera*)..... 272

Abstract. Manganese deficiency is a common and potentially fatal disorder of palms growing in highly leached and calcareous soils. Soil applications of $MnSO_4$ may not always be effective in treating this disorder due to rapid oxidation of Mn to less available forms. Trunk injection with $MnSO_4$ (2.0 g Mn) was found to be more effective in increasing foliar Mn concentrations than soil application (192 g Mn) or petiole injections with 0.1 g Mn in a single hole, or 0.5 g Mn divided among four holes. In contrast to trunk injection, neither petiole injections nor soil application of $MnSO_4$ increased foliar Mn concentrations above that of the untreated control palms. Trunk injections, while effective, result in permanent wounds that could potentially serve as entry sites for the trunk pathogen *Thielaviopsis paradoxa*, especially on young palms with minimal trunks.

Key Words. Fertilization; Palm; Manganese Deficiency; Manganese Sulfate; Micronutrients.

Bruce R. Roberts and R. Scott Linder

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Abstract. To test the potential effectiveness of humectant-containing compounds for improving soil moisture availability in the rhizosphere of newly transplanted trees, one-year-old Jiffy Plug™ and bare-root seedlings of red maple (*Acer rubrum* L.) and red oak (*Quercus rubra* L.) and one-year-old bare-root seedlings of yellow-poplar (*Liriodendron tulipifera* L.) were treated with Hydretain ES™ (HydES) and EcoSential™ (EcoS) in greenhouse studies. Both products were applied as a root drench to seedlings in 3.8 L plastic pots containing soilless substrate. Following treatment, water was withheld and days to wilt (DTW) recorded for each seedling. For red maple, HydES at the recommended rate (16 mL/L, X), as well as at 0.75X and 0.5X, was effective in increasing DTW, as was EcoS at 16 mL/L (the recommended rate, X) and at 0.75X. For red oak, the lowest concentration of HydES (0.5X) was ineffective, but the two higher levels (X and 0.75X) increased DTW significantly when compared to untreated controls. For yellow-poplar, DTW was consistently greater in treated than in untreated seedlings, but the differences were not always statistically significant. The data also indicate that for certain species (e.g. red maple), production type (Jiffy Plug or bare root) may influence the degree to which seedlings respond to humectant treatment.

Key Words. Organic Amendments; Production Type: Red Maple; Red Oak; Root Zone Moisture Management; Yellow-Poplar.

Edward F. Gilman and Forrest J. Masters

Effect of Tree Size, Root Pruning, and Production Method on Root Growth and Lateral Stability of *Quercus virginiana*..... 281

Abstract. This research aimed to evaluate impact of slicing the outer edge of container root balls, initial tree size at planting, and root ball composition on post-planting tree stability in a simulated wind storm. One-hundred twenty Cathedral Oak® live oak were planted in March 2005. Thirty field-grown trees were transplanted, and 60 trees of similar size were planted from 170 L containers. Root ball sides on 30 containers were sliced prior to planting. Thirty smaller trees from 57 L containers were planted without slicing. Trees were pulled with an electric winch, and blown with a hurricane simulator in 2007. Slicing the root ball had no impact on root growth, bending moment, or bending stress. More bending stress was required to pull field-grown trees than trees planted from containers of either size. Growing trees in containers for three years prior to landscape planting changed root morphology compared to field-grown trees, which corresponded to reduced stability. Trees planted from small containers were as stable as those from larger containers. Root cross-sectional area windward correlated the most with bending stress required to tilt trees with a winch and cable. Bending moment scaled to the 3.4 power of trunk diameter.

Key Words: Bending Stress; Container-Grown; Field-Grown; Root Cross-Sectional Area; Root Diameter; Root Number; Saturated Soil; Trunk Diameter; Wind.