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The Influence of Abiotic Factors on Street Tree Condition and Mortality in a Commercial-Retail Streetscape 133

Abstract. It is challenging to successfully grow trees in highly-urbanized areas, such as downtown commercial-retail districts. As part of a streetscape revitalization project, initiated in 2010, 133 London planetrees (*Platanus* × *acerifolia*) were planted in structural soil cells along the downtown, commercial district of Bloor Street in Toronto, Ontario, Canada. After most trees experienced severe decline, with many dying, all trees were removed and replaced in 2015. This research reports on an investigation of multiple abiotic factors that may have contributed to the decline and mortality of the Bloor Street trees. Researchers collected cross-sectional data on soil texture, soil compaction, soil chemistry, built-environment characteristics (e.g., proximity to road intersections, pit or bed planter), sunlight availability, and historic data on tree condition and mortality, and analyzed them with multivariate statistical techniques (e.g., correlation, MANOVA, contingent, and ANOVA tests) to investigate the potential for relationships to tree mortality (mortality rate of 46.6% before removal) and tree condition. Results indicate that trees that were alive and demonstrated better structural and foliar condition before removal in 2015 had significantly lower levels of soil salinity and alkalinity, sunlight exposure, and signs of physical damage, suggesting co-occurring and cumulative impact of these variables on tree performance. Modification to streetscape design can ameliorate tree decline in the long term, while education targeted at raising awareness about de-icing salt application and irrigation practices will lessen tree stressors immediately.
Key Words. De-Icing Salts; London Planetree; *Platanus* × *acerifolia*; Structural Soil Cell; Sunlight Availability; Toronto; Urban Soils.

Rachael A. Sitz, Marcelo M. Zerillo, Jacob Snelling, Jorge Ibarra Caballero, Kathleen Alexander, Kendra Nash, Ned A. Tisserat, Whitney S. Cranshaw, and Jane E. Stewart
Drippy Blight, a Disease of Red Oaks in Colorado, U.S., Produced from the Combined Effect of the Scale Insect *Allokermes galliformis* and the Bacterium *Lonsdalea quercina* subsp. *quercina* 146

Abstract. Drippy blight is an emergent disease of red oaks, caused by the interaction between a kermes scale insect (*Allokermes galliformis*) and a bacterium (*Lonsdalea quercina* subsp. *quercina*). Multi-locus sequence analysis was used to confirm the bacterial pathogen's identity and its relationship to other phylogenetically related Enterobacteriaceae species. Further, Koch's postulates were performed on sapling red oaks. Prior to the discovery of drippy blight disease in Colorado, in the United States, the bacterium was reported on oak trees in California but was limited to acorn infections. The scale insect, *A. galliformis*, was previously known to occur on pin oak in the eastern United States but was not previously associated with either this bacterium or the production of significant branch dieback associated with drippy blight. In addition to a description of this new disease, this research documents a host range expansion of *L. quercina* subsp. *quercina* to northern red oak (*Quercus rubra*), Shumard oak (*Q. shumardii*), and pin oak (*Q. palustris*) and extends the reported host range of *A. galliformis* to include northern red and Shumard oaks.
Key Words. *Allokermes galliformis*; Bacteria; Colorado; Drippy Blight; *Lonsdalea quercina,* Red Oak; Scale Insect.

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Sakthi Kumaran Subburayalu and Davis Sydnor
Results and Implications Following a Twelve-Year Monitoring of Ash (*Fraxinus* spp.) Mortality Due to *Agrilus planipennis* in an Urban Forest Plantation 154

Abstract. Identifying ash genotypes that are resistant to emerald ash borer (*Agrilus planipennis* Fairmaire) (EAB) continues to be an effort of importance to widen the existing knowledge on interspecific variation in EAB-host preference, identify mechanisms involved in EAB infestation, and aid in development of EAB-resistant ash hybrids that could potentially serve as viable replacements in urban plantations. A research plantation composed of 17 cultivars and 2 seedlings of ash trees was established in Toledo, Ohio, U.S., to monitor the susceptibility of these trees to EAB. The tree mortality was recorded on an annual basis since 2005. The results from the study and its implications, at the end of 12 years of monitoring, are presented in this paper. The study reaffirmed what is known about the resistance of the Asian ash species *Fraxinus mandshurica* ('Mancana') and the general susceptibility of North American ashes to EAB. However, it was observed that the degree of susceptibility to EAB varied across the different cultivars, with white ash cultivars 'Autumn Purple' and 'Rosehill' showing higher survival rates. However, this conclusion is based on a low replication, and all but one individual of each cultivar were infested at the end of the study. The findings suggest a need for continued and thorough screening of ash cultivars for identifying resistant genotypes.

Key Words. *Agrilus planipennis*; Emerald Ash Borer; Exotic Pests; Interspecific Variation; Resistance; Urban Forestry.