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CONTENTS

Abstract. Background: Urban forests enhance mental health by reducing loneliness, fostering connections to nature, and reducing stress and anxiety. There is growing interest in understanding how urban forests can help support mental health across the life course, including among young adults. Given the known psychological and social benefits of nature-rich environments, it is critical to evaluate the functionality and usage of urban forest spaces for specific groups, particularly those at higher risk of mental health conditions like the members of this age group. Methods: This student-led research study at the University of British Columbia's Vancouver campus applied a mixed methods approach to assess the role of campus courtyards in supporting student wellbeing, with the ultimate aim of informing inclusive and effective spatial planning. Eight courtyards were analyzed via surveys and participant observation to understand their restorative and social benefits. Involving students as researchers played a vital role in offering alternative perspectives that helped identify previously overlooked gaps in this field. Results: Our findings highlight the value of nearby, convenient greenspaces for young adults. There were 46 survey participants who shared their experiences in UBC courtyards, focusing on restorative and social benefits; 139 courtyard uses were observed by student researchers. Courtyards varied in biodiversity, order, and seclusion. Biodiverse courtyards received higher ratings for restoration, while social courtyards were linked to less reported guilt due to taking breaks. Across courtyard design typologies, students valued privacy, vegetation, and a sense of inclusion, although feelings of loneliness and discontent persisted. Conclusions: This study demonstrates the value in engaging students as researchers to understand student perceptions of a campus urban forest for supporting wellbeing, social connection, and academic achievement. Although greenspaces such as courtyards are known to have restorative potential, they are not always designed to fully support student needs, highlighting the importance of student-informed planning frameworks that address existing gaps and foster more accessible, functional, and representative greenspaces on campuses.

Keywords. Biodiversity; Campus Courtyards; Campus Landscapes; Loneliness; Restoration; Student Mental Health; Student Wellbeing; Students as Researchers.

Abstract. Background: While many tree professionals recognize the importance of planting quality stock and a diversity of species to enhance longevity and increase urban forest resiliency, the availability of such stock is often limited. Methods: To address this disconnect, we conducted 3 focus groups with growers, designers, urban foresters, and other technical experts from the Chesapeake Bay watershed region (USA) to identify challenges and opportunities for growing greater numbers of high-quality, underused species. Results: Contract growing was seen as a key opportunity for increasing quality and diversity. Additionally, increased communication between growers and tree purchasers, as well as potential partnerships with nonprofit or state nurseries, were identified as potential solutions where the marketability of underused species was limited. There were differences among participants regarding their preferences for native species, non-native species, cultivars, and non-cultivars. Conclusions: While this research focused on the tree supply chain within the Chesapeake Bay watershed, many of the challenges and opportunities discussed are not region-specific, making our findings applicable to professionals beyond the study area.

Keywords. Green Industry; Tree Nursery; Urban Greening.

Abstract. The threat and eventual loss of ash trees (*Fraxinus*) to emerald ash borer (*Agrilus planipennis*) in Minneapolis, MN, USA, was a major opportunity to establish a more diverse and resilient public street tree population. This generational opportunity was embraced. With the goal of increasing urban forest resiliency against future pests and conditions, Minneapolis developed and applied multiscaled tree selection guidelines to systematically select and plant a diverse mix of trees. Within a relatively short amount of urban forest time, the diversity of the Minneapolis public street tree population greatly increased. Within the past two decades, the number of genera that make up 1% or more of the public street tree population has nearly doubled. Before the guidelines, maple (*Acer*) comprised 30% of the public street tree population. Currently, there are no genera that comprise 20% or more of the public street tree population in Minneapolis. As a result of the guidelines, there is more diversity across the whole city, within neighborhoods, and along individual street block segments. The benefits of this diversification will hopefully lessen the exposure to and impact of future urban forest pests and other challenging conditions.

Keywords. Diversity; Minneapolis, MN, USA; Resilience; Tree Selection Guidelines.

Abstract. Background: Small and large cities typically both have street trees, but small cities have fewer resources to manage them. Three 1980s papers assessed that small rural cities in the state of Iowa, USA, were at a disadvantage in managing street trees as reflected in the diversity, age, and condition of their street tree populations. This paper analyzes more current street tree inventory data in conducting a similar assessment. Methods: Street tree inventory data were obtained from small, midsize, and large Iowa cities for 2008 to 2024. Tree diversity, age, and condition were analyzed based on city size. Diversity was assessed by relative abundance percentages and diversity index statistics, age by trunk DBH distributions, and condition by ratings for tree wood and leaves. Results: Small cities have less street tree diversity than midsize and large cities. A diversity *t*-test found statistically significant differences based on city size. Small and midsize cities were found to have older tree population profiles than large cities. Large and midsize cities had better condition wood ratings than small cities, but little difference was found between cities for leaf condition. Conclusions: Inventory data suggest that Iowa's small cities still face challenges managing their street trees. Lack of funding is the reason most often cited. Progress is being made although its extent cannot be determined due to lack of longitudinal data. There remains a need to assist Iowa's small cities in sustainably managing their street trees and maintaining the benefits they provide.

Keywords. City Size; Climate Change; Street Trees; Tree Diversity; Tree Management.

Abstract. Background: The periodical cicadas of Brood X (Hemiptera: Cicadidae) emerged in the summer of 2021, shortly after several thousand trees were planted throughout the District of Columbia, USA, during 2020 to 2021. There was concern that the millions of cicadas would negatively impact recently planted trees. This presented an opportunity to assess the impacts of periodical cicadas on an urban tree planting program. Methods: Newly planted trees were surveyed, with field inspections and remote sensing techniques, for evidence of cicada egg laying and twig damage related to tree genus and location within trees and throughout the District. Results: There were significant differences in egg-laying behavior among 10 tree genera, with the most damage observed in *Acer* and *Nyssa*. Egg laying occurred most often in scaffold and lateral branches. Egg-laying intensity was positively correlated with percent foliage lost. There was little evidence of cicada impacts on tree health as tree condition was unrelated to egg-laying intensity. Survival of the 2020 to 2021 tree cohort was similar to previous years without a large-scale cicada emergence. Remote sensing was unsuccessful in differentiating cicada caused damages from other damage. Conclusions: Municipal urban forestry departments facing a large periodical cicada emergence may continue tree planting campaigns and avoid damage to new trees by choosing less preferred genera. Although useful, remote sensing products are not currently at the point where a non-remote sensing specialist can acquire and utilize these tools for identifying cicada damage. Field surveys are recommended for accurate delimitation of cicada activity in urban settings.

Keywords. Brood X; Hemiptera; Integrated Visual Assessment; Magicicada; Oviposition; Periodical Cicada; Remote Sensing; Tree Planting; Urban Forestry.

Abstract. Mulch is placed around the base of trees to improve soil conditions, water conservation, and tree growth while decreasing weed competition, mower damage, and soil compaction. Current industry best practices and trade magazine articles recommend a mulch depth of 5 to 10 cm (2 to 4 inches) and caution against exceeding this depth, warning of issues affecting stem tissue like stem girdling roots and pathogens. To examine scientific support for this threshold, we conducted a systematic review of the peer-reviewed literature on excess mulch depth. We identified 11 studies that examined the effects of increasing depths of mulch on tree and soil physiology. All but two studies tested mulch depths exceeding the 5- to 10-cm (2- to 4-inch) range. The impact of deep mulch is unclear; methodological differences, including mulch type and examined variables, limit comparisons between studies. It is possible that fine mulch with low porosity results in deleterious effects similar to planting trees too deeply, explaining observations by practitioners. While further research should determine the effects of mulch depth beyond 10 cm (4 inches) on tree physiology, there are often negative side effects reported for exceeding 10 cm (4 inches) but few negative effects reported for mulch depths within 5 to 10 cm (2 to 4 inches).

Keywords. Arboriculture; Best Management Practices; Industry Standards; Landscape Maintenance; Mulch Volcanoes.
