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CONTENTS

Abstract. Background: This study aimed to evaluate bioactive compounds and initial growth parameters of *Jacaranda mimosifolia* seedlings under shading levels and substrate compositions. Methods: A completely randomized design arranged in a 3 × 5 factorial scheme (3 shading × 5 substrates) was used. The shading levels were 0%, 30%, and 50%. The substrates were compost made up of organomineral material (M) and vermiculite (V): 100/0 M:V, 80/20 M:V, 60/40 M:V, 40/60 M:V, and 20/80 M:V. Results: Producing *J. mimosifolia* seedlings under the full sun is not recommended in tropical conditions. The 30% and 50% shade screens reduced photosynthetically active radiation by 38% and 62%, respectively. In the 50% shading environment, the average number of leaves increased by 68%, the stem diameter by 60%, the shoot dry matter by 250%, the root dry matter by 113%, the total dry matter by 184%, and the quality of the *J. mimosifolia* seedlings by 127%. The cultivation in the 50% shading environment, on average, increased the chlorophyll *a* content by 77%, the chlorophyll b content by 56%, the total chlorophyll content by 70%, and the carotenoid content of the *J. mimosifolia* seedlings by 45%. A substrate containing 20%M for *J. mimosifolia* seedlings is not recommended. The best *J. mimosifolia* seedlings are produced in the 50% shading environment and the 100%M substrate, resulting in better biometric quality and higher chlorophyll and carotenoid contents in addition to promoting an improvement in the survival rate and acceleration in initial growth.

Keywords. Organominerals; Photosynthetic Pigments; Protected Environments; Screenhouse.

Abstract. Oak wilt, caused by *Bretziella fagacearum*, is a significant threat to oak trees in Texas. The pathogen can be spread by underground root grafting of trees, and this means of transmission is the most effective and damaging means of spread for the live oak (*Quercus fusiformis* and *Q. virginiana*) mottes in central Texas. Trenches are created between disease centers and healthy trees in the hope to sever or disrupt root connections to limit the spread of the pathogen. This study subsampled 275 from a total dataset of 2,124 installed trenches to evaluate the effect of soil factors, specifically root zone depth and particle size, on the probability of trench breakouts in central Texas. Pathogen transmission breakout data created from 1990 to 2020 under the Texas Oak Wilt Suppression Project cost-share was used to determine if soil particle size and/or rooting depth could predict the success or failure of trenching in slowing the spread. Our results showed that for the subsampled trenches, the overall breakout of oak wilt was 39% compared to a 19% measured breakout for the entire dataset. Root zone depth and soil particle size significantly influenced breakout likelihood. Deeper root depth was associated with a higher probability of trench breakouts, particularly in clayey soils, while finer and silty soils demonstrated a lower risk. The findings highlight the importance of considering soil characteristics when implementing trenching strategies to control oak wilt spread. This study is the first to explore soil-related factors affecting oak wilt management in Texas and suggests that additional environmental variables could further improve predictive models of trench success.

Keywords. Forest Health; IPM; Oak Wilt; Pathogen.

Abstract. Background: Sustainable cities will require water sensitive urban design (WSUD) that integrates street trees, urban soils, and engineered infrastructure. However, there can be a perception that these systems contribute to ground/soil movement that can be problematic for hard infrastructure. There is concern that diverting water into kerbside harvesting systems for street trees may exacerbate ground movement.

Method: Twenty-eight small kerbside stormwater harvesting systems that diverted storm runoff into roadside soakage wells were dispersed along a residential street in an inner suburb of the City of Adelaide, South Australia. The wells can be utilized with or without the presence of street trees, but greater utility and environmental benefits could be achieved with vegetation. Regular measurements of ground level were undertaken to determine ground movement over a period of 2 years, comparing sites with and without soakage wells. Results: Results showed that stormwater harvesting and infiltration into the site's reactive clay did not increase ground movement at the kerb or at the road surface during periods of above and below average rainfall. Kerb levels generally remained within +10 mm (heave) and −15 mm (settlement) of the reference datum, and movement at the top of the asphalt road seal was no greater than +7 mm or −6 mm. The maximum extent of ground movement (sum of the maximum heave and maximum settlement) at any point was 26 mm, but typical movement at 9 points, 6 of which were near inlets, was 4 mm. Ground movement was of similar amplitude near and further from infiltration points and was unaffected by stormwater harvesting. Conclusion: The use of trees within WSUD, particularly in fine clay soils in which root growth increases water harvesting and storage, can substantially contribute to urban hydrology through canopy rainfall interception, hydraulic redistribution, enhanced soil conductance through biopore creation, and preferential flow along root channels. This research shows that the presence of soakage wells does not lead to increased ground movement in reactive clay soils.

Keywords. Green Infrastructure; Reactive Clay Soils; Soakage Wells; Stormwater; Stormwater Management.

Abstract. Background: Urban afforestation is widely recognized for providing numerous aesthetic and functional benefits to both the population and the environment. However, poor planning ranging from improper species selection to inadequate tree management can lead to various issues, including accidents caused by falling trees. These incidents often result from root failure, underdeveloped root systems, or advanced tree degradation. Methods: To evaluate a tree's root system, indirect methods are recommended, particularly in urban environments with sidewalks or pavements. Techniques such as sonic tomography and ground penetrating radar (GPR) each have their own advantages and disadvantages when applied to urban trees. This study aimed to assess and compare qualitatively the use of sonic tomography and GPR to characterize the root systems of 5 trees located on a sidewalk and in a square. Additionally, a new visualization approach for tomographic data is presented, using kriging interpolation of velocity and error values. Results: The results established a qualitative relationship between the high velocity zones detected by tomography, indicating root presence, and the roots mapped by GPR. The new visualization of tomography data provides better opportunities for clearer interpretation together with information of measurement errors. Conclusions: Sonic tomography and GPR both assess trees roots in urban environments, but sonic tomography is faster for mapping the extent of root coverage, whereas GPR provides a more detailed characterization of the root system's spatial distribution, depth, and diameter of coarse roots.

Keywords. GPR; Sonic Tomography; Tree Root System; Urban Trees.

Abstract. Background: A widespread trend of declining and dying mature oaks has been observed in the Chicago region since 2019. While there have been studies on the stress-physiology of white oaks and the epidemiology of decline diseases, there have not been any studies focusing on the relationship between predisposing abiotic site and soil characteristics and white oak decline in the Chicago metro area. The objective of this study was to determine if site and soil characteristics are significantly related to white oak decline in the Chicago region. Methods: Soil and site characteristics were compared between 66 healthy and declining trees of the white oak group on 32 sites in the summer of 2023. During site visits, deep pedon samples, composite soil samples, fine roots for oomycete detection, site characteristics, tree health assessments, and site management information were collected. DAS-ELISA Phyt tests and soil lab analyses were conducted. Results: Low micronutrient levels, compaction, elevated soil sodium, and poor drainage appear to be the most relevant predisposing abiotic site characteristics for white oak decline through ANOVA and GLMMs. The ELISA Phyt tests were 88% positive for both healthy and declining trees. Conclusions: Results from this study can help arborists and urban foresters improve management and treatment design and implementation for white oaks, improve our understanding of the predisposing factors influencing the health of managed trees, and improve future planting guidelines.

Keywords. *Quercus alba*; *Quercus macrocarpa*; Site Quality; Tree Health; Urban Soil.

Abstract. Background: It is essential to provide higher quality environments for the development of human activities in urbanized areas, such as better adapted urban centers. Regarding concerns related to climate change, there is a discussion about joint efforts to establish an ideal standard to be followed worldwide, significantly increasing the ecosystem services provided by urban forests, which directly affects the community's quality of life. Methods: This research aimed to characterize neighborhoods with different per capita incomes according to the 3-30-300 guideline in Cachoeiro de Itapemirim, a medium-sized Brazilian municipality. An inventory of the road component of urban forests was carried out for 9 neighborhoods from 3 different economic strata based on average per capita income. Results: No neighborhood considered in the different per capita incomes fully complied with the 3-30-300 guideline. There was no difference in applying the guideline about the socioeconomic distinctions of the neighborhoods evaluated. Only 1 neighborhood in 9 evaluated (Neighborhood H) presented canopy coverage values above 30% because its urbanization process had not fully occurred, thus presenting a high percentage of the remaining natural forest matrix. Only one neighborhood evaluated (Neighborhood F) had all residences no more than 300 m from a public green area. Conclusions: There is a need for public authorities to assess the implementation and maintenance of urban forests in the municipality, aiming to increase them significantly. It is worth noting that when the urban environment is not planned considering the precepts of 3-30-300, its parameters can be measured using it.

Keywords. Canopy Cover; City Trees; Green Areas; Injustice.

Abstract. Background: This study demonstrated the potential of in-ground (IG) termite monitoring stations coupled with chitin synthesis inhibitor (CSI) baiting as a complementary solution to visual inspection for tree termite detection and control in Singapore. Methods: Using lure wood pieces collected from activated IG stations to serve as a basis for comparison, we evaluated the destructiveness of detected termite species and reported their unique feeding patterns. Chitin synthesis inhibitor (CSI) baiting with chlorfluazuron was used for termite control. Results: A total of 6 termite species were detected: *Coptotermes gestroi* (Wasmann), *Coptotermes curvignathus* (Holmgren), *Schedorhinotermes medioobscurus* (Holmgren), *Macrotermes gilvus* (Hagen), *Macrotermes carbonarius* (Hagen), and *Microcerotermes crassus* (Snyder). However, the detection capability varied depending on site conditions such as intermittent flooding events, high soil salinity, and reduced foraging behavior after nesting within or near a host tree. This behavior of reduced foraging, in part, could be affected when heavily infested trees are removed, forcing termites to migrate and search for new food sources, leading to activation of nearby IG stations. In terms of termite control, CSI baiting with chlorfluazuron could effectively eliminate termite colonies for 3 species: *C. gestroi*, *C. curvignathus*, and *S. medioobscurus*. Colony elimination time ranged from 3 to 6 weeks and 24 weeks, respectively. Conclusion: Considering the effectiveness of IG stations coupled with CSI bait in detection and control of subterranean termite species, large-scale application of this system in an urban tree context is discussed.

Keywords. Chitin-Synthesis Inhibitor; Coptotermes; In-Ground Termite Monitoring; Subterranean Termite; Termite Baiting.