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**Silicon Mitigates the Attack of Pests and Diseases on Ipê-Roxo (*Handroanthus impetiginosus*) Seedlings..... 145**

**Abstract.** Background: Silicon in plants is a structuring element that promotes water and saline stress tolerance and decreases transpiration. The silica accumulated in the cuticle establishes a physical barrier and helps fight against pests and diseases. The present study aimed to evaluate the development of ipê-roxo (*Handroanthus impetiginosus*) seedlings in different environments, and the application of potassium silicate and its efficiency in mitigating the attack of pests and diseases. Methods: The experiment was carried out in an agricultural greenhouse and under full sun with silicic doses of 0 and 7.15 mg per plant in a completely randomized design arranged in a 2 × 2 factorial scheme, with 6 replications of 4 seedlings per plot. Plant height, chlorophyll, stem diameter, number of leaves, shoot dry matter, root dry matter, total dry matter, height-diameter ratio, root-shoot ratio, root-plant ratio, Dickson quality index, disease severity, and pest intensity were evaluated. Results: Silicon application did not confer biometric qualities to the seedlings. The application of silicon conferred 24.6% higher protection against disease severity at a 90% probability level. The protected environment promoted 48.8% more protection against the attack of pests on the seedlings. The silicon application decreases the intensity of pests in the protected environment by 36.3%. Seedlings in a protected environment increase the production of chlorophyll but are 29.6% more susceptible to the severity of diseases. The full sun promoted greater diameters, phytomass, and Dickson quality index by 18%, 73%, and 195%, respectively. Conclusions: The best *Handroanthus impetiginosus* seedlings were obtained under full sun. Silicon mitigated the attack of pests and diseases on *Handroanthus impetiginosus* seedlings.

**Keywords.** Bignoniaceae Family; Shading; Silicate.



Glynn C. Percival and Christopher D. Percival

**Evaluation of Heat Tolerance in Foliar Tissue of *Acer* Genotypes ..... 157**

**Abstract.** Background: Extreme summer heat events in which temperatures exceed 40 °C are expected to increase in duration and intensity worldwide. Consequently, selecting heat-tolerant trees for future predicted climatic conditions will be one of the significant challenges for urban landscape managers. Method: The effect of heat stress (44 °C for 4 hours) on chlorophyll variable:maximum fluorescence (Fv/Fm) ratios and Soil Plant Analysis Development (SPAD) values as measures of damage to the leaf photosynthetic system and leaf chlorophyll content was quantified in 8 *Acer* genotypes (*Acer pseudoplatanus* ‘Negenia’, *A. pseudoplatanus* ‘Spaethii’, *A. platanoides* ‘Royal Red’, *A. platanoides* ‘Princeton Gold’, *A. platanoides* ‘Emerald Queen’, *A. platanoides* ‘Drummondii’, *A. campestre*, *A. campestre* ‘Louisa Red Shine’). Results: Fv/Fm ratios proved to be a sensitive indicator of heat damage and positively identified marked differences in tolerance to and recovery from heat damage between the 8 *Acer* genotypes. Estimated leaf chlorophyll content (SPAD) was not sufficiently sensitive to distinguish differences in tolerance and recovery between genotypes. Conclusions: Chlorophyll fluorescence Fv/Fm ratios, but not estimated leaf chlorophyll content (SPAD), offers a rapid screening technique for assessing the tolerance to and recovery from heat stress in leaf tissue of trees.

**Keywords.** Heat Waves; Maple; Photosynthesis; Photosystem II; Species Selection; Urban Heat Island Effect; Urban Trees.

Eyob Tenkir, Tamrat Bekele, Sebsebe Demissew, and Ermias Aynekulu

**Site Suitability, Early Survival, and Growth Performance of Five Indigenous Tree Species to Integrate in Urban Green Space of Addis Ababa, Ethiopia ..... 169**

**Abstract.** Background: We evaluated site suitability, early survival, and growth performance for *Juniperus procera*, *Olea europaea* subsp. *cupidata*, *Vachellia abyssinica*, *Hagenia abyssinica*, and *Afrocarpus falcatus* in the urban landscape of Addis Ababa, Ethiopia. Methods: The MaxEnt model was used to evaluate site suitability for the 5 indigenous species. For the early survival study, experimental plots were

established and 500 seedlings, 100 seedlings for each species, were planted on 2021 July 15 and monitored until 2022 February 30 for a total of 225 days. Silvicultural activities such as mulching, weeding, and watering were conducted. Every 45 days, measurements of height, root collar diameter (RCD), death, damage, wilting, and defoliation were recorded. Results: The result of the study indicated that the Addis Ababa area is well to moderately suitable to grow the 5 species. Mean survival rates marginally declined over the course of 225 days, from 99.6% at 45 days after planting to 90.4% at 225 days after planting. Eighteen *V. abyssinica* seedlings were found to be dead. Wild animals browsed and damaged 45% of *O. europaea* seedlings. *H. abyssinica* had the highest growth performance. The study shows that, relative to the other 4 species, *V. abyssinica* had a greater number of wilted, defoliated, and dead seedlings. Conclusion: Each of the 5 species had a high rate of early survival and found the urban environment to be suitable. This result will assist in the shift away from planting only exotic tree species in green spaces and encourage the presence of indigenous tree species.

**Keywords.** Early Survival; Indigenous Species; Restoration; Suitability; Tree Planting.

Alexander J.F. Martin and Lukas G. Olson

## **A Review of Diversity, Equity, and Inclusion Themes in Arboriculture Organizations'**

**Codes of Ethics ..... 185**

**Abstract.** Codes of ethics (COEs) play an important role in outlining an association's ethical expectations of its membership. Diversity, equity, and inclusion issues in arboriculture have been long-standing, resulting in prevalent systemic inequality and discrimination within the industry. Codes of ethics may provide a means through which to address systemic barriers; however, unlike the forestry industry, there is limited understanding of how arboriculture organizations' codes of ethics approach diversity, equity, and inclusion. This review of 9 national and international arboriculture organizations' codes of ethics examines how equity, diversity, and inclusion are included within the expected ethical conduct of professional members. Through thematic and qualitative content analyses, we found that arboriculture organizations' codes of ethics varied in length and depth, ranging from 7 to 47 statements in codes of ethics. Most ethical codes were positively framed, indicating what members *should* do, rather than the contrasting negative framing which indicates what members *should not* do. Of the 9 arboriculture organizations, 7 included equity, diversity, and inclusion statements. Inclusion codes were the most common ( $n = 6$  COEs), followed by equity ( $n = 5$  COEs) and diversity ( $n = 3$  COEs). In total, 8 codes of ethics referenced adherence to laws and regulations, 4 of which may provide a means for promoting ethical practice in the absence of explicit statements about equity, diversity, and inclusion.

**Keywords.** Accessibility; Arboriculture Governance; Best Management Practices; DEI; Environmental Governance; Forestry; Integrity; Morals; Principles; Professional Diversity; Standards; Urban Forester.