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Stephen C. Grado, Marcus K. Measells, and Donald L. Grebner

Revisiting the Status, Needs, and Knowledge Levels of Mississippi's Governmental Entities Relative to Urban Forestry..... 149

Abstract. In 2004, Mississippi State University researchers determined the status, needs, and knowledge levels of Mississippi's community leaders and communities relative to urban and community forestry benefits, programs, funding opportunities, and program implementation. As a result, this project's goals were to build on past research and identify trends for past and current involvement and future interest levels among Mississippi's small (<2,000 people) to large (>10,000 people) communities for urban and community forestry programs and assistance. This current effort revisited these communities, previously surveyed in 2004, and highlighted changes in knowledge levels and various activities and programs undertaken. A mail survey was sent to 293 Mississippi communities with 163 surveys returned for a response rate of 55.6%. In general, communities responding indicated that a sizable number of officials have increased their awareness or interest in urban and community forestry. Communities that wanted to establish programs the most again cited a lack of funding as the reason for not initiating projects or sustaining existing programs. Greater effort in disseminating information on funding opportunities was seen as necessary, given that most Mississippi communities were only aware of a few national programs. Participation in statewide or local urban forestry programs and activities was minimal. The authors' previous study found that without quality, updated information on urban and community forestry and reliable funding, communities are limited in undertaking systematic planning and associated programs utilizing arboreal resources. Good information distribution, which has improved, and reliable funding are still limiting communities in undertaking systematic planning and associated urban and community forestry programs.

Key Words. Large Communities; Medium-sized Communities; Mississippi; Reassessment; Small Communities; Survey Research; Urban and Community Forestry.

David Armson, Mohammad Asrafur Rahman, and Anthony Roland Ennos

A Comparison of the Shading Effectiveness of Five Different Street Tree Species in Manchester, UK..... 157

Abstract. One major benefit of urban trees is the shade they provide on sunny days; this reduces the heat stored in engineered surfaces and lowers the heat load on people, increasing their comfort. This study compared the shading effectiveness of five small street tree species within the urban landscape of Manchester, UK. The area of shade produced by each tree during early and midsummer 2012 was calculated from morphological measurements, such as canopy height, width, and aspect ratio. The effect of tree shade on air, mean radiant and surface temperatures was also compared and related to the leaf area index (LAI) of the canopy. It was found that tree shade reduced mean radiant temperatures by an average of 4°C, though neither tree species nor LAI had a significant effect. Tree shade reduced surface temperatures by an average of 12°C, and the tree species and LAI both had significant effects. Tree species with higher LAI, *Crataegus laevigata* and *Pyrus calleryana*, provided significantly more cooling than the other species, and surface temperature reduction was positively correlated with LAI. This study has shown that trees are useful in improving both human thermal comfort and reducing surface temperatures in urban areas, and that selection of tree species with high LAI can maximize the benefits they provide.

Key Words. England; Human Thermal Comfort; Manchester; Mean Radiant Temperature; Surface Temperature; Tree Shade; United Kingdom; Urban Heat.

Mark G. Stewart, Dealga O'Callaghan, and Mark Hartley

Review of QTRA and Risk-based Cost-benefit Assessment of Tree Management 165

Abstract. Quantified Risk Assessment (QRA) has been in wide use in risk management since the 1960s for systems ranging from aviation, nuclear power, and offshore platforms to medical treatment and pharmaceuticals. The Quantified Tree Risk Assessment (QTRA) system is examined considering the principles of QRA. A case study of 14 fig trees in Newcastle, Australia, illustrates some limitations of the QTRA process, and extrapolating risks for a single tree to a group of trees. There is a need for any risk management process involving trees, not only to assess the risk, but to weigh the benefits provided by trees by a risk-based cost-benefit analysis. Tree risk assessors should rely on benchmarks to ensure that their assessment is not outside of the realms of reality or scientific rigor.

Key Words. Australia; Cost-benefit Analysis; Quantified Tree Risk Assessment; Risk; Risk Management; Trees.

Edward F. Gilman, Jason Miesbauer, Chris Harchick, and Richard C. Beeson

Impact of Tree Size and Container Volume at Planting, Mulch, and Irrigation on *Acer rubrum* L. Growth and Anchorage 173

Abstract. Some trees uproot in storms apparently due to root deflections that occur during nursery production. Root deflection in a nursery container may lead to poor anchorage because of insufficient root growth into the landscape soil, and container volume/tree size at planting may influence root deflection. This study was designed to evaluate establishment, root growth, and anchorage six years after planting *Acer rubrum* L. trees of four different sizes from four corresponding container volumes and maintaining them with two irrigation regimes. Impact of mulch on establishment and root growth was also evaluated. Trees from the largest containers grew slowest in the first three years due primarily to water stress. Trunk tilt during winching tests increased due to greater root deflection, less mass of the root-soil plate, and reduced root growth into the landscape soil with increasing container volume and tree size. In contrast to the poorly anchored larger trees that had most of their large roots retained in the original planted root ball volume, the largest roots on trees from smaller containers grew freely into landscape soil. This resulted in stable trees with many stiff, straight roots pushing down against mineral landscape soil outside the root ball during winching. Trees planted from smaller containers appear to anchor sooner than trees from larger containers and would be more stable in a storm.

Key Words. Bending Stress; Container Production; Root-soil Plate; Straight Roots.

Glynn C. Percival and Jonathan M. Banks

Water-retaining Polymer and Fungicide Combinations Reduce Disease Severity Caused by Horsechestnut Leaf Blotch [*Guignardia aesculi* (Peck) VB Stewart] 182

Abstract. The influence of six commercially available fungicides incorporated into a water-retaining polymer and applied to the root system of horsechestnut (*Aesculus hippocastanum* L.) as a dip at the time of planting was conducted. Potential increases in resistance against the foliar pathogen *Guignardia* leaf blotch (*Guignardia aesculi*) was then monitored over two growing seasons. Trials were conducted in 2007 and duplicated in 2008. A comparative evaluation of the fungicide penconazole commercially used for *Guignardia* leaf blotch control was studied by spraying trees at the manufacturer's recommended rate of four times during the first growing season but none in the second. None of the treated or control trees died as a result of *Guignardia* leaf blotch attack during the course of the study and none of the fungicide and water-retaining polymer combinations evaluated was phytotoxic to the test trees. Efficacy as *Guignardia* leaf blotch protectant compounds over the first growing season was demonstrated when fungicides were incorporated into a water-retaining polymer. Reductions in *Guignardia* leaf blotch severity were mirrored by increases in leaf chlorophyll fluorescence as a measure of leaf photosynthetic activity and leaf chlorophyll content SPAD values. There were little differences in the magnitude of control efficacy between the fungicides evaluated. Limited efficacy of any of the fungicide and water-retaining polymer combinations as *Guignardia* leaf blotch protectant compounds was, however, demonstrated the following year after application indicating a fungicide and water-retaining polymer root dip provided one growing season protection only. Application of a water-retaining polymer alone had no effect on reducing *Guignardia* leaf blotch severity. Based on visual *Guignardia* leaf blotch severity ratings, greatest protection in both the 2007 and 2008 trial was provided by the synthetic fungicide penconazole applied as a foliar spray four times during the growing season. No efficacy of penconazole foliar sprays as leaf blotch protectant compounds was demonstrated the following year, indicating annual sprays against *Guignardia* leaf blotch are required for control.

Key Words. *Aesculus hippocastanum*; Disease Management; Chlorophyll Fluorescence; Leaf Chlorophyll Content; Plant Health Care; Tree Planting.

Emily Jack-Scott, Max Piana, Blake Troxel, Colleen Murphy-Dunning, and Mark S. Ashton

Stewardship Success: How Community Group Dynamics Affect Urban Street Tree Survival and Growth 189

Abstract. Over the last two decades, there has been a substantial increase in street tree plantings across the United States. Many cities have set ambitious planting goals, relying on volunteer community groups to meet them. Existing research demonstrates that community stewardship increases the survival of urban street trees. There is a lack of research, however, on how defining characteristics of community groups affect the survival and growth of the trees they plant. This study explores the significance of community group size (# participants), type (apartment, block watch, church, concerned neighbors, park, public housing, school, and social service), planting longevity (# years active), experience level (# trees planted), and neighborhood (geo-political boundaries). Measured for this study were 1393 trees planted from 1995 to 2007, by 134 groups, through the Urban Resources Initiative's Community Greenspace program in New Haven, Connecticut, U.S. There was an overall survival rate of 76%. Highest survival and growth was found among trees planted by groups with more planting experience, greater longevity, and more participants. Higher tree survival and growth was observed when trees were planted by groups working in line with their mission (e.g., park groups in parks). Lowest survival and growth was found among yard trees planted by public housing groups. Existing canopy cover and neighborhood percent homeownership had little effect on survival or growth. This research can offer guidance for city managers by suggesting which planting groups require particular assistance in conducting successful, lasting street tree plantings.

Key Words. Community Forestry; Connecticut; Mean Annual Growth Increment; Mortality; Percent Live Crown; Planting; Stewardship; Urban Ecology; Urban Forestry; Volunteer.