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Scott Cullen

TREE APPRAISAL: CHRONOLOGY OF NORTH AMERICAN INDUSTRY GUIDANCE 157

Abstract. Various individual tree appraisal methods emerged during the first half of the 20th century. Development of North American industry consensus methods was undertaken in 1947. These methods have been refined and elaborated, and additional guidance has been provided in subsequent revisions. Appraisers and appraisal users, however, are not always aware of the most current methods and guidance and may, unknowingly, rely on outdated versions. The purpose of this paper is to provide an accurate and quick reference to the chronology of North American industry-wide consensus methods and guidance for tree and plant appraisal. The differences among methods, guidance, and standards are also explained.

Key Words. Appraisal; Appraisal Guides; Tree appraisal; Valuation.

Michael A. Arnold, Garry V. McDonald, and Donita L. Bryan **PLANTING**

DEPTH AND MULCH THICKNESS

AFFECT ESTABLISHMENT OF GREEN ASH (*FRAXINUS PENNSYLVANICA*)

AND BOUGAINVILLEA GOLDENRAINTREE (*KOELREUTERIA BIPINNATA*) 163

Abstract. Most available information on the effects of planting depths for trees is anecdotal. Testing of interactions with other important cultural practices implemented during landscape establishment is lacking. Green ash (*Fraxinus pennsylvanica* H. Marshall), a hypoxia-tolerant species, and bougainvillea goldenraintree (*Koelreuteria bipinnata* A.R. Franchet), a hypoxia-intolerant species, were grown from seed in 2.3 L (#1) containers, which were later transplanted to 9.3 L (#3) black plastic containers and grown to a marketable size. Root collars of the plants were maintained level with the surface of the substrate. Green ash (1 May 2001) and bougainvillea goldenraintrees (27 April 2001) were transplanted to clay soil field plots with the root collars at 7.6 cm (3 in.) above soil grade, at grade, or 7.6 cm (3 in.) below grade. Planting depths for each species were in factorial combinations with 0, 7.6, 15.2, or 22.9 cm (0, 3, 6, or 9 in.), respectively, of pine bark mulch covering 0.74 m² (8 ft²) of soil beneath each tree. After 2 years, survival of bougainvillea goldenraintrees planted below grade was one-third that of those planted at or above grade. Survival and trunk diameter responses interacted with planting depth and mulch thickness for green ash. Planting below grade in combination with mulching reduced survival of green ash 25% to 50% after 3 years. Mulch applications reduced trunk diameters of green ash trees planted at or above grade. Mean soil water potentials were less negative with 7.6 cm (3 in.) of mulch (-5.8 kPa) compared to bare soil (-9.1 kPa), but increasing the mulch thickness to 22.9 cm (9 in.) inhibited penetration of irrigation water/rainfall (-16.2 kPa). These data suggest that planting with the root collar at or above grade enhances survival and growth potential of green ash and bougainvillea goldenraintree relative to planting below grade and that mulch applications should be only at thin layers sufficient to inhibit weeds. Bougainvillea goldenraintrees were more susceptible to the adverse effects of below-grade installation and excess mulch applications than were green ash trees.

Key Words. *Fraxinus pennsylvanica*; Hypoxia; *Koelreuteria bipinnata*; Pine Bark Mulch; Planting Depth; Transplant Establishment; Tree Planting.

D.R. Hodel, D.R. Pittenger, and A.J. Downer

PALM ROOT GROWTH AND IMPLICATIONS FOR TRANSPLANTING 171

Abstract. Palms need active root and shoot growth to establish quickly after transplanting. For many palm species, roots grow most abundantly during warmer months and occur within 30 cm (12 in.) of the trunk. Thus, palms can be transplanted year-round in warm regions where air and soil temperatures are nearly always sufficient to ensure adequate root and shoot growth. However, in regions with cool seasons, palms are best transplanted at the beginning of the warm season. For most species, root balls with a 30 cm (12 in.) radius from the trunk and 30 cm (12 in.) deep are adequate because they capture over half the roots. The few species that must grow nearly all their new roots from the trunk after transplanting need a root ball only large enough to protect the root initiation zone, about 15 cm (6 in.) out from the trunk. Species that grow about 30% or more of their roots below 30 cm (12 in.) deep would probably benefit from a deeper root ball, about 60 cm (24 in.) deep.

Key Words. Palms; Transplanting; Time of Year; Root ball Size; Root Growth; Root Initiation Zone.

F. Ferrini, A. Giuntoli, F.P. Nicese, S. Pellegrini, and N. Vignozzi

EFFECT OF FERTILIZATION AND BACKFILL AMENDMENTS ON SOIL CHARACTERISTICS, GROWTH, AND LEAF GAS EXCHANGE OF ENGLISH OAK (*QUERCUS ROBUR* L.)..... 182

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Key Words. Chlorophyll; Compost; Humate; Photosynthesis; Soil Characteristics.

Sarah B. Celestian and Chris A. Martin

EFFECTS OF PARKING LOT LOCATION ON SIZE AND PHYSIOLOGY OF FOUR SOUTHWESTERN U.S. LANDSCAPE TREES..... 191

Abstract. This study evaluated effects of two parking lot landscapelocations on size and physiology of four regionally common landscape tree species. Tree size measurements were made during August 2001 and 2002 and tree gas exchange and leaf chlorophyll concentrations were measured during April and August 2002. Trees were mostly smaller and leaf gas exchange fluxes were lower for Australian bottle tree (*Brachychiton populenus* Schott & Endl.), Arizona ash (*Fraxinus velutina* Torr.), and Chinese elm (*Ulmus parvifolia* Jacq.) located within narrow landscaped medians surrounded by asphalt compared with similarly aged trees in large landscaped areas along the parking lot perimeters. In contrast, parking lot location had no statistical effect on size of Argentine mesquite (*Prosopis alba* Griebach) except for diameter at breast height, which was significantly less for trees in the landscaped medians in 2002. Leaf chlorophyll concentrations of all trees located in landscaped medians were lower than those of trees within surrounding landscaped perimeter areas except for Australian bottle tree, which had higher significantly leaf chlorophyll concentration during April when located in landscaped medians. Based on these results, Argentine mesquite appears to be the best of these four tree species for use in commercial parking lot landscapes because its growth and physiological function were least affected by parking lot location.

Key Words. Asphalt; Chlorophyll; Commercial Land Use; Photosynthesis; Stomatal Conductance; Urban Trees.

Jay Cee L. Turner and Eileen A. Buss

BIOLOGY AND MANAGEMENT OF *ALLOKERMES KINGII* (HEMIPTERA: KERMESIDAE) ON OAK TREES (*QUERCUS* SPP.)..... 198

Abstract. The northern red-oak kermes scale, *Allokermes kingii* (Cockerell), is a native, gall-like scale insect found on oak trees (*Quercus* spp.) in the United States. Its feeding causes branch dieback, flagging, reduced growth rates, and occasionally tree death. *Allokermes kingii* has one generation a year throughout most of the United States, but we found two generations a year in Florida. It also infests *Q. geminata* Small and *Q. virginiana* Miller, which represent new host records. The insecticides tested (acephate, bifenthrin, imidacloprid, horticultural oil, and combined acephate and oil) appeared to suppress the nymphal population, but none caused >42% mortality. Very few natural enemies occurred on the study trees, and were thus considered ineffective at reducing the scale population at this site.

Key Words. *Allokermes kingii*; Insecticide Trial; Kermesidae; Northern Red-Oak Kermes; *Quercus geminata*; *Quercus virginiana*.

Joseph J. Docola, Ilangoan Ramasamy, Paulina Castillo,

Christine Taylor, and Samantha Sifleet

ERRATUM: EFFICACY OF ARBORJET VIPER MICROINJECTIONS IN THE MANAGEMENT OF HEMLOCK WOOLLY ADELGID (*ADELGES TSUGAE*)..... 203

Editor's note: The authors have submitted this correction to their earlier paper, which was originally published in the November 2003 issue of the Journal of Arboriculture (29(6):327-330). This article clarifies the presentation of their statistical analyses.

Abstract. Hemlock woolly adelgid (*Adelges tsugae* Annand) is an introduced homopteran that infests native eastern hemlock (*Tsuga canadensis* Carriere). It results in reduced tree vitality and, when untreated, death. A state-of-the-art microinjection device employing an air-over-hydraulic system was used to deliver a therapeutic dosage of imidacloprid into the active xylem tissues of affected hemlocks. Bioassays were conducted microscopically to determine HWA mortality post-treatment. Injected trees had significantly ($P < 0.05$) lower HWA populations compared to untreated controls; mean mortality for injected trees was over twice that of noninjected trees. The Arborjet VIPER system shows promise as a management tool in the treatment of HWA.

Key Words. *Adelges tsugae*; Arborjet VIPER; Homoptera; Imidacloprid; *Tsuga* spp.