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E.M. Zimmerman and L.G. Jull

**Sodium Chloride Injury on Buds of *Acer platanoides*,
Tilia cordata, and *Viburnum lantana* 45**

Abstract. Dormant lateral buds of Norway maple (*Acer platanoides* L.), littleleaf linden (*Tilia cordata* Mill.), and wayfaringtree viburnum (*Viburnum lantana* L.) were collected and exposed to nine NaCl concentrations: 0, 500, 1,000, 2,000, 4,000, 8,000, 16,000, 32,000, and 64,000 mg/L (0, 500, 1,000, 2,000, 4,000, 8,000, 16,000, 32,000, and 64,000 ppm) in December 2001 and January and March 2002. Electrolyte leakage and visual observations of inner and outer tissue discoloration were used to assess injury. Bud injury generally increased as NaCl concentration increased. Bud morphologies of each species were related to tissue discoloration patterns; naked buds were more susceptible to NaCl than those with bud scales. Buds also exhibited seasonal NaCl resistance; the greatest resistance occurred in December. Norway maple, wayfaringtree viburnum, and littleleaf linden buds experienced 50% electrolyte leakage at calculated NaCl values of 12,941, 16,901, and 42,594 mg/L (12,941, 16,901, and 42,594 ppm) NaCl, respectively, but no severe inner tissue discoloration occurred at any level of NaCl treatment. In January, 50% electrolyte leakage occurred at lower NaCl concentrations in Norway maple [7,165 mg/L (7,165 ppm)] and littleleaf linden buds [27,118 mg/L (27,118 ppm)]. Moderate to severe inner tissue injury was detected for all species at 1,000 mg/L (1,000 ppm) NaCl. Buds were most susceptible to NaCl injury in March, with moderate to severe inner tissue discoloration occurring in wayfaringtree viburnum and littleleaf linden buds at 500 mg/L (500 ppm) NaCl.

Key Words. Bud Morphology; Electrolyte Leakage; Salt Tolerance; Tissue Discoloration; Winter Injury.

William F. Elmendorf and A.E. Luloff

**Using Key Informant Interviews to
Better Understand Open Space Conservation in a Developing Watershed 54**

Abstract. Open space provides people and the places where they live with numerous, well-documented benefits, very similar to those of trees and other landscaping. Often lost in the complicated development and growth arena, planning for the conservation of the green infrastructure of open space is important for healthy communities. The process of open space conservation provides arborists and urban foresters with opportunities to involve the community in planning and activism. Conserved open space provides arborists and urban foresters with maintenance and management opportunities and responsibilities. Although expensive and time-consuming, key informant interviews helped provide a logical process for a deeper understanding of open space conservation in a developing Pennsylvania watershed. This qualitative process can be used by urban foresters and others in more inclusive and successful planning and decision making. As an investigative tool, the interviews provided information about attitudes, issues, and obstacles expressed by local leaders. The interviews also provided evidence that concerns expressed by experienced planners since the 1960s about land use planning and open space conservation in growing areas continue to be relevant today.

Key Words. Growth and Development; Key Informant; Land Use Planning; Open Space Benefits; Open Space Conservation.

Balakrishna Rao, Donald H. Marx, and Brian Jeffers

**Response of Oaks and Elm to Soil Inoculations
With Mycorrhizal Fungi and Rhizobacteria in a Nursery 62**

Abstract. Live oak (*Quercus virginiana*), laurel oak (*Q. laurifolia*), and Drake elm (*Ulmus parvifolia*) seedlings were grown for 1 year in 4L (1 gal) containers and then transplanted on 3 m (10 ft) centers at a nursery in Florida, U.S. Two years later, in April 2002, ten seedlings per tree species were treated by (1) soil injection with mycorrhizal fungi and rhizobacteria; (2) drenching with rhizobacteria and soil fungi applied monthly for 5 months; (3) a combination of (1) and (2); (4) drenching with Subdue® fungicide; or (5) nontreated controls. Root growth and mycorrhizal development were measured with root ingrowth cores. After 1 year (1 April, 2003), mycorrhizal development and root growth as well as stem calipers were greater in treatments containing the mycorrhizal fungi for all three species. The rhizobacteria treatment also increased root and stem growth on Drake elm. The fungicide, Subdue, did not significantly affect mycorrhizal development or root or stem growth. There were few naturally occurring mycorrhizae on roots of trees in this nursery.

Key Words. Ectomycorrhizae; Vesicular-Arbuscular Mycorrhizae (VAM).

Ryan A. Blaedow, William R. Chaney, Paul C. Pecknold, and Harvey A. Holt

Investigation of Fungicidal Properties of the Tree Growth Regulator Paclobutrazol to Control Apple Scab 67

Abstract. Paclobutrazol (PBZ) as a systemic fungicide for control of apple scab (*Venturia inaequalis*) was investigated in mature (cv. Hopa and Snow Drift) and young sapling (cv. Indian Magic) crabapples (*Malus* spp.). Treatments consisted of a control and PBZ applied to mature trees at one or two times the recommended rate in April 2002 using the basal drench method. Saplings received either foliar or soil drench applications of PBZ, or foliar applications of propiconazole. Disease assessments of mature trees showed that apple scab symptoms in treated trees were as severe as in untreated ones in the year of treatment but were reduced slightly the year after treatment in 'Hopa' and the third year after treatment in 'Snow Drift.' Growth reduction occurred in all treated trees, suggesting that the PBZ levels needed for growth reduction were not sufficient to control apple scab in the year of treatment. In contrast, a one-time foliar application of PBZ reduced apple scab incidence to levels found in 'Indian Magic' saplings treated every 2 weeks with propiconazole, a fungicide and application method commonly recommended for apple scab control. Delayed uptake and insufficient transport of PBZ to the foliage of mature trees after root drench treatments may account for the lack of apple scab control in the years after treatment, even though growth suppression occurred.

Key Words. Apple Scab; Growth Regulator; Paclobutrazol; Systemic Fungicide; *Venturia inaequalis*.

Edward F. Gilman and Jason C. Grabosky

Branch Union Morphology Affects Decay Following Pruning..... 74

Abstract. Branch diameter relative to the trunk diameter (aspect ratio) affected the extent of discolored and decayed wood in the trunk of seedling-propagated red maple (*Acer rubrum* L.) after branch removal. More discoloration resulted from removing codominant stems than removing branches that were small compared to the trunk. Removing limbs that originated from lateral buds resulted in the same amount of discoloration and decay as removing suppressed limbs that were once the leader. This result provides indirect evidence that a small codominant stem suppressed by pruning techniques designed to slow its growth rate can result in a branch protection zone at the union. There was no relation between the presence of a bark inclusion and decay 4 years after making pruning cuts.

Key Words. *Acer rubrum*; Aspect Ratio; Bark Inclusions; Branch Protection Zone; Codominant Stems; Compartmentalization; Decayed Wood; Discolored Wood; Pruning; Wounding.

Bonnie L. Appleton

Designing and Implementing Utility Line Arboreta 80

Abstract. In the United States, a significant conflict exists between overhead utility lines and inappropriately tall trees planted in or near line easements. A major goal of Virginia, U.S.'s Municipal Tree Restoration Project is the establishment of utility line arboreta in multiple state locations as a way to evaluate, showcase, and promote trees compatible with overhead utility lines. Three different utility line arboreta models have been developed that can be replicated anywhere internationally to deal with this important infrastructure conflict. A stepwise list of considerations and potential funding sources for developing utility line arboreta is provided, as well as a comparison of the advantages and disadvantages of the three described utility line arboreta models.

Key Words. Electrical Power; Line Clearance; Municipal Tree Restoration Project (MTRP); Power Outage; Species Selection; Utility-Compatible Trees; Utility Easements; Utility Pruning; Utility Right-of-Way Management.