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Abstract. An action threshold (AT) is often established to determine if and when control treatments are required for pest populations. In municipal settings, control treatments for insects defoliating the urban forest are typically determined in response to customer requests, maintenance demands of highly visible municipal public spaces, economic requirements, and actual insect damage. In 2006, the City of Regina Integrated Pest Management section created a new method of establishing an AT for cankerworm control by determining if monitoring counts for female cankerworms (*Paleacrita vernata* Peck and *Alsophila pometria* L.) were greater than 95% of an identified "normal" population range when based on historical records.

Key Words. *Acer*; Action Threshold; *Alsophila pometria*; Defoliation; Empiric Rule; *Fraxinus* spp.; Geometridae; Lepidoptera; *Paleacrita vernata; Populus spp.; Ulmus americana.*

Abstract. Urban and Community Forestry (U&CF) program capacity within the 50 United States was derived through four indicator areas that included the state U&CF program coordinator, volunteer coordination, state U&CF council, and strategic plan. The agency and administrative unit where the program resides, year of program initiation, staffing levels and expertise area, additional non-U&CF responsibilities of staff, and coordination of U&CF within a state were further studied. Each state had an U&CF program coordinator (most were full-time), practiced varying volunteer coordination approaches, had a state U&CF council, and had a regularly updated strategic plan. Most states had additional regional U&CF staff with the majority of their time devoted to U&CF activities with a mean 4.2 (median, 3.2) full-time equivalents of total U&CF staff in a state. Occasionally, non-U&CF duties were conducted by U&CF staff with fire control, forest stewardship, special projects, and forest health most commonly given as other areas conducted by U&CF staff. Most state U&CF programs used a variety of approaches to support volunteer-based U&CF efforts in a state. All states now have a U&CF coordinator with 95% of their duties associated with U&CF activities. State U&CF councils vary in their membership and approaches for coordination of U&CF within a state.

Key Words. State Urban and Community Forestry Programs; Urban and Community Forestry; Urban Forestry; Urban Forestry Program Capacity.

Abstract. A review of root barrier research from the past 40 years is presented. Research has resulted from the need to minimize conflicts between the expanding roots of trees and urban infrastructure such as roads, curbs, sidewalks, foundations, and underground utilities. The history of root barriers, naming conventions, and different classes are described. The results of experiments and surveys are examined, the successes and failures of different barriers are noted, and directions for future research are suggested.

Key Words. Curbs; Infrastructure Conflicts; Roads; Root Barriers; Roots; Sidewalks; Street Trees; Urban Trees.

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Abstract. The chlorophyll content (or SPAD meter) is a simple, portable diagnostic tool that measures the greenness or relative chlorophyll content of leaves. Compared with the traditional destructive methods of chlorophyll extraction, the use of this equipment saves time, space, and resources. The objective of this study was to establish a correlation between the leaf photo-synthetic pigment content (chlorophylls, carotenoids) extracted in aqueous acetone, total leaf nitrogen (N) content, and chlorophyll fluorescence Fv/Fm values with the SPAD-502 readings in sycamore (*Acer pseudoplatanus*), beech (*Fagus sylvatica*), and English oak (*Quercus robur*) leaves displaying visual symptoms of N deficiency. In addition, this study aimed to determine a critical foliar N content below which a reduction in photosynthetic efficiency occurs. Irrespective of species, high correlations were recorded between SPAD readings, total leaf chlorophyll and carotenoid content, foliar N content, and leaf photosynthetic efficiency as measured by chlorophyll fluorescence Fv/Fm values; however, a poor correlation between SPAD values and total chlorophyll: carotenoid ratios was obtained. In the case of *Acer pseudoplatanus*, *Fagus sylvatica*, and *Quercus robur*, SPAD readings lower than 25 indicated impairment of leaf photosynthetic process that in turn were correlated with a foliar N content less than 1.5%, a value associated with a critical N deficiency. Results of this study indicate that the chlorophyll content SPAD-502 m potentially offers a useful nondestructive, handheld system to aid in the evaluation of tree health. However, users should be aware of the limitations of this system. Consistency in sample collection and seasonal timing may necessitate species and cultivar calibration equations to correlate SPAD values with reductions in tree vitality.

Key Words. Carotenoids; Chlorophyll Fluorescence; Chlorophylls; Light Transmittance; Nitrogen Fertilization; Stress Detection; Tree Evaluation.

Abstract. Shade trees provide many benefits but can cause damage if they fail. Despite the potential for costly litigation that sometimes arises when damage occurs, there are no investigations of bending moments and stresses involved in failure of shade trees. Twenty-four shade trees of three species in the genus Acer were pulled to failure at a suburban property in Massachusetts, U.S. The maximum load and distance to failure were used to calculate maximum bending moment; stress at the point of failure was calculated from bending moment and stem cross-sectional dimensions. No trees uprooted, and failures were categorized as either stem at a lateral branch(es) or the attachment of codominant stems. Failures of codominant stems required one-half of the stress of stem failures. Similarly, failures of codominant stems occurred at only 45% of wood strength, whereas stem failures occurred at 79% of wood strength. Prediction of maximum bending moment from tree morphometric data was more reliable than prediction of maximum stress from tree morphometric data. Prediction of maximum bending moment and stress was more reliable for stem failures than codominant failures. Results are compared with similar tests on conifers. Implications of findings are discussed with respect to risk assessment of shade trees.

Key Words. Codominant Stems; Tree Failure; Tree Pulling; Trunk Stress

Abstract. Pacific madrone (*Arbutus menziesii*) has been experiencing a decline in the Puget Sound area, primarily as a result of a canker disease caused by the fungus *Fusicoccum arbuti*. Cultural methods such as prevention of stress and wounding are recommended to control canker diseases on trees. In addition to these, injected treatments can be used to protect valuable Pacific madrone trees in urban areas. An experiment testing injectable chemical fungicides and plant activators was performed on Pacific madrone trees inoculated with *F. arbuti*. There was little correlation between fungicidal activity in culture and canker reduction in the field tests. Two treatments that were effective in minimizing canker growth in inoculated madrones were Arbotect®(Syngenta Crop Protection Inc., Greensboro, NC, U.S.; a triazole fungicide) and BioSerum™(phosphorous acid). Cankers on wound inoculations were 50% smaller than the control group and no infections occurred on surface-inoculated treatments. Increased callusing was observed on cankers on trees with these treatments and the mode of action for these chemicals is probably stimulation of plant defenses rather than fungicidal action. Phosphorous acid is recommended in addition to cultural methods that improve tree vigor for high-value madrone trees in urban landscapes; however, heavily infected trees that have lost most of their crown will probably not benefit.

Key Words. Arbotect®; *Botryosphaeria*; Canker; *Fusicoccum*; Injectible Fungicide; Pacific Madrone (*Arbutus menziesii*); Phos-Phorous acid; Plant Activator.

Abstract. Six mark-recapture experiments were conducted in Manitoba, Canada, to determine the effectiveness of fluorescent powder to mark emerging native elm bark beetle adults, *Hylurgopinus rufipes* (Eichoff) (Coleoptera: Scolytidae), the vector of Dutch elm disease, *Ophiostoma novo-ulmi* (Brazier), after departure from overwintering sites in spring and emergence from broodwood in summer. Native elm bark beetles marked themselves on emergence from overwintering sites and summer trap logs. The spring and summer periods of flight activity for unmarked and marked beetles were similar. Marked beetles were captured over 1 month after peak emergence in the spring and 2 months after emergence from trap logs in the summer. Marked beetles were captured up to 1 km (0.6 mi) from release sites. Where integrated Dutch elm disease management activities are implemented in buffer zones to minimize the number of elm bark beetles entering community urban forests, buffer zones should be a minimum of 1 km (0.6 mi) in width.

Key Words. Dutch Elm Disease; *Hylurgopinus rufipes*; IPM; Marking; Plant Health Care; Scolytidae.

Abstract. Two root-pruning methods simulated construction-related trenching and individual root cuts such as from decay after root pruning. Tree trunks were pulled to an angle of 1° from vertical using measured force. A third of the study trees were pulled to failure to determine the relationship between the 1° pull force and the pull-to-failure force. The regression had correlation with r2 equal to 0.76. Utility trenching was simulated with linear cuts across the root zone. Measurable decreases in force applied occurred when cuts were within three times the trunk diameter from the trunk. Force decreased by 35% when a tangential cut was made at the trunk. When individual roots were severed, the pull force was reduced with each root cut. When one root was severed, the decrease in force averaged 12%; when half of the exposed buttress roots were severed, the decrease was 30%. Arborists should avoid cutting any tree roots near the trunk. Linear trenching should not be closer to the trunk than a distance equal to or greater than three times the trunk diameter.

Key Words. Construction Damage; Pull Testing; Root Anchorage; Root Barrier; Root Decay; Root Plate; Utility Trenching; Windthrow.

Abstract. Through the Municipal Tree Restoration Program, cooperators planted eight serviceberry (*Amelanchier* spp.) cultivars in 15 communities for evaluation as street trees, typically comparing two in each community. Standardized measurements in years 1, 2, 3, 6, 9, and 12 revealed differences in trunk diameter, height, crown width, and health of foliage and branches. Among the four cultivars that have been tested most extensively, the main difference is that Cumulus® and Robin Hill are much taller in the twelfth year than Tradition® and Autumn Brilliance®. 'Cole's Select', 'Princess Dianna", Reflection™, and Spring Glory® also have been performing well for 6 to 10 years, but they have been tested at just one or two locations. Survival, growth, and health have been superior on more spacious sites, but with proper care, serviceberry cultivars can do well even along downtown streets. All eight of these cultivars are appropriate for planting under overhead wires.

Key Words. *Amelanchier*; Performance Testing; Serviceberry Cultivars; Street Tree Evaluation.