ARBORICULTURAL ABSTRACTS

EVALUATION OF FOUR METHODS FOR ESTIMATING LEAF AREA OF ISOLATED TREES

P.J. Peper and E.G. McPherson

The accurate modeling of the physiological and functional processes of urban forests requires information on the leaf area of urban tree species. Several nondestructive, indirect leaf area sampling methods have shown good performance for homogenous canopies. These methods have not been evaluated for use in urban settings where trees are typically isolated and measurement may be complicated by proximity to residential areas, buildings, signs, and other infrastructure elements. We evaluated the accuracy, precision, efficiency, and other practical considerations associated with four methods of estimating the leaf area of open-grown deciduous trees in urban forests. The methods included color digital image processing (CD), the LAI-2000 Plant Canopy Analyzer, the CI-100 Digital Plant Canopy Imager, and a logarithmic regression equation. Regression coefficients, adjusted R^2, and confidence intervals were used to determine the best method when using true leaf area of 25 *Platanus* × *acerifolia* Willd. and 25 *Platanus racemosa* Nutt. as an independent variable. Practical considerations included ease of data collection and processing and costs associated with each method. The CD method and LAI-2000 estimates showed good correlation with true leaf area ($R^2 > 0.71$); however, only the CD method produced estimates within 25% of mean true leaf area and met additional requirements for accuracy, precision, and efficient use in urban settings. (Urban For. Urban Green. 2003. 1(2):19–29)

EFFECT OF WATER STRESS ON INFECTION BY SPECIES OF HONEY FUNGUS (*ARMILLARIA MELLEA* AND *A. GALLICA*)

T.O.S. Popoola and R.T.V. Fox

Isolates of *Armillaria mellea* and *A. gallica* that differed in virulence to healthy blackcurrant, strawberry, Lawson cypress, and privet were used to inoculate plants exposed to different watering regimes. Host plants from which water had either been withheld or their roots kept constantly flooded with water both showed increased susceptibility compared to those plants, which had been watered regularly. At the end of the period of stress, roots from randomly selected plants from each treatment were harvested. Following chemical analysis of the roots for protein, lipids, and carbohydrates including starch, in vitro assays were carried out with these substances. The increased amounts of these nutrients in both groups of stressed plants are sufficient to stimulate the growth of both *A. mellea* and *A. gallica* and enhance their virulence. (Arboric. J. 2003. 27(2):139–154)

A REVIEW OF TREE ROOT CONFLICTS WITH SIDEWALKS, CURBS, AND ROADS

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Literature relevant to tree root and urban infrastructure conflicts is reviewed. Although tree roots can conflict with many infrastructure elements, sidewalk and curb conflicts are the focus of this review. Construction protocols, urban soils, root growth, and causal factors (soil conditions, limited planting space, tree size, variation in root architecture, management practices, and construction materials) are discussed. Because costs related to sidewalk and curb damage are substantial, a review of research addressing repair, mitigation, prevention, and litigation costs is included. Finally, future research needs are discussed. Potential for conflicts between trees and sidewalks/curbs is high when one or more of these factors are present: tree species that are large at maturity, fast-growing trees, trees planted in restricted soil volumes, shallow topsoil (hardpan underneath topsoil), shallow foundations underneath the sidewalk (limited or no base materials), shallow irrigation, distances between the tree and sidewalk of less than 2.0 or 3.0 m (6.6 or 10 ft), trees greater than 15 to 20 years old. The results of this survey indicate that cities are spending substantial sums of money to address conflicts between street tree roots and infrastructure. It can be inferred that most of theses expenditures are spent dealing with problems that already exist. However, this raises the question: How much is being spent now to ensure that conflicts are minimized in the future? Future research should concentrate on plant factors, site design, and construction of sidewalks and curbs. Also, more knowledge is needed about interactions between root growth and management techniques, such as pruning and irrigation. Finally, there is need for studies that will assist policy-makers to efficiently allocate funds among repair, mitigation, prevention, and legal remedies. (Urban Ecosyst. 2001. 5:209–225)

NONDESTRUCTIVE TECHNIQUES FOR DETECTING DECAY IN STANDING TREES

D. Ouis

This paper reviews the different techniques used to investigate whether the trunk of a standing tree is hosting rot or not. The most widespread and efficient techniques may in general be classified under two wide classes depending on the signal used for investigating the tree trunk. The first category includes the vibro-acoustical techniques using either vibrations at frequencies within the acoustical bandwidth or sound waves at acoustical or ultrasonic frequencies. The second class of techniques uses various methods based on electromagnetic radiation. There are furthermore some other techniques which are more or less destructive, and which are also presented in the current work. These techniques are destructive, but to a lesser extend than the well-known, fully destructive ones inasmuch as only a small sample is extracted from the tree trunk to be submitted to test. (Arboric. J. 2003. 27(2):159–177)

PLANT-RELATED FACTORS INFLUENCE THE EFFECTIVENESS OF NEOSEIULUS FALLACIS (ACARI: PHYTOSEIIDAE), A BIOLOGICAL CONTROL AGENT OF SPIDER MITES ON LANDSCAPE ORNAMENTAL PLANTS

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The predatory mite *Neoseiulus fallacis* (Garman) was evaluated as a biological control agent of herbivorous mites on outdoor-grown ornamental landscape plants. To elucidate factors that may affect predator efficiency, replicated tests were conducted on 30 ornamental plant cultivars that varied in relationship to their generalized morphology (e.g., conifers, shade trees, evergreen shrubs, deciduous shrubs, and herbaceous perennials), production method (potted or field grown), canopy density, and the prey species present on each. Plant morphological grouping and foliar density appeared to be the most influential factors in predicting successful biological control. Among plant morphological groups, *N. fallacis* was most effective on shrubs and herbaceous perennials and less effective on conifers and shade trees. *Neoseiulus fallacis* was equally effective at controlling spider mites on containerized (potted) and field-grown plants, and there was no difference in control of mites on plants with *Tetranychus* spp. versus those with *Oligonychus* or *Schizotetranychus* spp. Moderate to unsuccessful control of spider mites by *N. fallacis* occurred mostly on tall, vertical plants with sparse canopies. Acceptable spider mite control occurred in four large-scale releases of *N. fallacis* into production plantings of *Abies procera, Thuja occidentalis* 'Emerald', *Malus* root stock, and *Viburnum plicatum* 'Newport'. These data suggest that *N. fallacis* can be an effective biological control agent of multiple spider mite species in a range of low-growing and selected higher growing ornamental plants. (J. Econ. Entomol. 2002. 95(6):1135–1141)

TREE PROTECTION LEGISLATION IN EUROPEAN CITIES

A. Schmied and W. Pillmann

In this study, a survey on regulations and legal requirements concerning tree protection in European cities has been elaborated. It is designed as an information source for decision support in legal development, city planning, and nature conservation. The survey is based on questionnaires on the one hand and on laws, ordinances and regulations on the other. Out of the 34 cities which were contacted or for which legal documents were found on the Internet, 25 (74%) have laws protecting trees in public and/or private areas. Against the background of rising ecological awareness, most of the laws were adopted from the 1970s onward. In most cases, the protection of a tree is regulated by means of the circumference or the diameter of the stem, while sometimes the height of the tree is the criterion on which protection depends. In other cases, protection is granted if a tree is growing in a protected area or if the tree is under the protection of a tree preservation order. In all 25 cities, the felling of protected trees is subjected to an official authorization. In many laws, interdictions concerning trees are listed. Most frequently, it is prohibited to cut down, to remove, to fell, to damage, to destroy, to modify, and to prune protected trees, and to enhance their decay. A law concerning tree protection seems to make sense, if it can be implemented in a nonbureaucratic, professional, and efficient way, respecting the protection and conservation of nature. It should be structured simply and equitably, and its administration and implementation should be simple and efficient. (Urban For. Urban Green. 2003. 2(2):115–124)