



## CONTENTS

Randall James, Ned Tisserat, and Tim Todd

### Prevention of Pine Wilt of Scots Pine (*Pinus sylvestris*) with Systemic Abamectin Injections ..... 195

**Abstract.** We examined the efficacy of the insecticide/nematicide abamectin to prevent pine wilt disease caused by the pinewood nematode (*Bursaphelenchus xylophilus*) in Scots pine (*Pinus sylvestris*). Pinewood nematode movement was inhibited (>80% death or paralysis) following a 48 hr exposure to abamectin concentrations as low as 0.1 µL a.i. per L (100 ppb). A commercial formulation of abamectin (Avid™) was injected into Scots pine using a pressurized systemic trunk injection tube (STIT) technique. Fifteen to 30 mL (0.45 to 0.90 fl oz) of Avid per STIT could be injected into the trees in less than 1 hr. Trees were successfully injected throughout February, March, and April at temperatures above 4.4°C (40°F). Survival after 1 year of 10 cm diameter (4 in) at breast height (dbh) Scots pines injected with Avid and subsequently inoculated with pin wood nematode was higher (75%) than in pines injected with water (42%). Similarly, survival after 3 years of large Scots pines (30 to 60 cm [12 to 24 in] dbh) injected with Avid and exposed to a natural epidemic of pine wilt was higher (96%) than in noninjected pines (33%) or those injected with water (71%). These results indicate that preventive injections of Scots pine with Avid are effective in protecting against pine wilt disease.

**Key Words.** Abamectin; Avid; *Bursaphelenchus xylophilus*; Pine Wilt; Pinewood Nematode; *Pinus sylvestris*; Scots Pine; Tree Injections.

Daniel K. Struve, Petra Sternberg, Nick Drunasky, Kurt Bresko, and Rico Gonzalez

### Growth and Water Use Characteristics of Six Eastern North American Oak (*Quercus*) Species and the Implications for Urban Forestry ..... 202

**Abstract.** Seedling growth and water use of six North American oak species were studied in a series of four experiments to determine inter- and intraspecies water use characteristics. Xeric-site adapted species (chestnut oak, *Q. prinus* [L.] and black oak, *Q. velutina* [Lamb.]) had slower growth (height and dry weight accumulation and lower shoot:root ratios) than mesic-site adapted species (bur oak, *Quercus macrocarpus* [Michx.]; pin oak, *Q. palustris* [Muenchh.], northern red oak, *Q. rubra* [L.]; and Shumard oak, *Q. shumardii* [Buckl.]). Principal component analysis (a statistical technique used to identify correlated variables) using 11 variables found that seedling water use loaded positively with seedling growth factors (taller seedlings tended to have higher dry weights and greater leaf and root areas and used more water than shorter seedlings, which tended to have lower dry weights, smaller leaf, and root areas) in the first principal component. However, in the third experiment, seedling growth factors loaded negatively with seedling water use for *Q. prinus*. Tall *Q. prinus* seedlings tended to use less water than short seedlings. However, other measures of water use (g water cm<sup>-1</sup> height and cm<sup>-2</sup> leaf and root area) loaded negatively on the first principal component. Correlations between seedling heights and seedling water use were significant and positive, but great within-species and within half-sib family differences in height-adjusted water use (g water cm<sup>-1</sup> height) were found. By plotting height-adjusted water use against seedling height, efficient and inefficient water use seedlings could be identified. Inefficient water use seedlings were shorter and had higher water use cm<sup>-1</sup> height than efficient water use seedlings. Inefficient water use seedlings were described as having a xeric-water use habit, whereas tall seedlings had a mesic water use habit. Potentially, height-adjusted water use could be used as a method for selecting individual oak seedlings better adapted to stressful urban planting sites.

**Key Words.** Dry Weight; Water Use Efficiency; Xeric- and Mesic-site Adapted Species. **Species used in this study.** Bur Oak (*Quercus macrocarpus* (Michx.)); Pin Oak (*Q. palustris* (Muenchh.)); Chestnut Oak (*Q. prinus* (L.)); Northern Red Oak (*Q. rubra* (L.)), (*Q. shumardii* (Buckl.)), (*Q. velutina* (Lamb.)).

Christopher J. Luley and Jerry Bond

### Evaluation of the Fate of Ice Storm-Damaged Urban Maple (*Acer*) Trees ..... 214

**Abstract.** Annually, ice storms cause millions of dollars of damage to urban trees and infrastructure in the United States and Canada. However, there is limited information to guide judgments on whether to remove ice-damaged trees. This study followed the response of three maple species that were damaged in the 1998 ice storm in northern New York State. Norway (*Acer platanoides*), silver (*A. saccharinum*), and sugar maples (*A. saccharum*) were placed in one of three diameter classes and canopy loss categories and were reevaluated 6 years after the initial damage. Over the 5-year study period, 26.8% of trees were removed, and there was no statistical difference among species, crown loss, or diameter class for these removals. Analysis of a variety of tree health and crown parameters showed that tree species was the most important factor in response, whereas diameter class and crown loss were less important. These results suggest that urban tree managers should consider tree species as an important factor in making removal decisions after an ice storm.

**Key Words.** *Acer platanoides*; *Acer saccharinum*; *Acer saccharum*; Canopy Loss; Ice Damage; Maple Species; Norway Maple; Removal Rate; Silver Maple; Sprouting; Tree Response.

Brandon W. Wall, Thomas J. Straka, and Stephen E. Miller  
**An Econometric Study of the Factors Influencing Participation in Urban and Community Forestry Programs in the United States** ..... 221

**Abstract.** Public participation in urban and community forestry (U&CF) programs in the contiguous 48 states of the United States can be explained by several different factors using econometric methods. The state's percent of working population, income level, percent of forested land, dominant political affiliation, state government expenditures on education, and the number of communities participating in U&CF programs help explain the public participation rates in the programs. These factors accounted for 52% ( $R^2 = 0.5218$ ) of the variability in public participation in U&CF programs in 2003. Knowing the factors that influence public participation in U&CF programs is vital to the success of the program and can assist federal, state, and local decision-makers in planning efforts.

**Key Words.** Econometric Model; Participation; Public Participation; Urban and Community Forestry; Urban Forestry.

J. Jess Fleming, Thomas J. Straka, and Stephen E. Miller  
**An Econometric Model to Predict Participation in Urban and Community Forestry Programs in South Carolina, U.S.** ..... 229

**Abstract.** A regression-based econometric model was generated from a statewide survey of South Carolina, U.S., residents concerning participation in urban and community forestry programs. The econometric model attempts to estimate the probability of an individual's participation. Results are intended to increase effectiveness of program planning and organization within state forestry commissions. Model 1 was created as follows: participation =  $F$  (gender, age, education, marital status, region, area raised, area reside, household, duties, and income). Because these responses represented qualitative values, a number of dummy variables (0 or 1, for example, for yes or no) were generated to more accurately reflect the values for participation and a logit model was used. Logit regression analysis produces a value between 0 and 1 that can be interpreted as a probability. Model 2, with fewer variables, was later created to reduce possible multicollinearity problems. Model 1 had a pseudo- $R^2$  value of 0.2955 or a 29.55% probability of having a correct prediction for participation. Model 2 had a pseudo- $R^2$  value of 0.2407. The models produced reasonable predictions of participation.

**Key Words.** Econometrics; Public Involvement; Urban and Community Forestry.

Herbert Schroeder, John Flannigan, and Richard Coles  
**Residents' Attitudes Toward Street Trees in the UK and U.S. Communities** ..... 236

**Abstract.** Research on residents' attitudes has shown that street trees are highly valued elements of the urban environment and that their benefits far outweigh their annoyances. Much of this research was done in communities in the United States, and it is uncertain whether the findings can be generalized to other communities or countries. We compared residents' opinions of street trees, perceptions of the benefits and annoyances trees provide, and preferences for tree size, shape, and growth rate between three communities in the United States and the United Kingdom. Overall, opinions of nearby street trees were positive and did not differ between the two UK communities and the U.S. community. Residents in the UK communities rated annoyances as more serious, shade as less of a benefit, and physical benefits as more significant than did the residents of the U.S. community. Respondents in the two UK communities also preferred smaller trees with slow growth rates. Although these comparisons cannot be used to make inferences about differences between the entire United Kingdom and United States, they do suggest some specific ways in which community characteristics such as climate and proximity of trees to houses may contribute to variation in attitudes toward trees.

**Key Words.** Attitudes; Benefits; Residents; Street Trees; United Kingdom; United States.

Christopher J. Fettig, Tom E. DeGomez,  
 Kenneth E. Gibson, Christopher P. Dabney, and Robert R. Borys  
**Effectiveness of Permethrin Plus-C (Masterline®) and Carbaryl (Sevin SL®) for Protecting Individual, High-Value Pines (*Pinus*) From Bark Beetle Attack** ..... 247

**Abstract.** Bark beetles (Coleoptera: Scolytidae) are commonly recognized as the most important mortality agent in western North American coniferous forests. High-value trees such as those located in residential, recreational, or administrative sites are particularly susceptible to attack. Regardless of landowner objectives, tree losses in these unique environments generally have a catastrophic impact. The value of these individual trees, the cost of removal, and the loss of aesthetics may justify protection until the main thrust of a bark beetle infestation subsides. This situation emphasizes the need for assuring that effective insecticides are available for individual tree protection. In this study, we assessed the efficacy of permethrin plus-C (Masterline®) and carbaryl (Sevin SL®) for protecting ponderosa, *Pinus ponderosa* Dougl. ex Laws., lodgepole, *P. contorta* Dougl. ex Loud., and pinyon, *P. edulis* Engelm., pines from bark beetle attack during two field seasons. Masterline® was effective for protecting *P. contorta* from mountain pine beetle, *Dendroctonus ponderosae* Hopkins, attack for one field season. However, Sevin SL® was efficacious for two field seasons. An insufficient number of *P. ponderosa* and *P. edulis* control trees were killed to make definitive conclusions regarding efficacy in those systems. The data reported here regarding Masterline® is the first published report on its effectiveness for preventing bark beetle attack on standing trees. Masterline® appears to be an effective individual tree protection tool, but repeated applications will be necessary if multiyear control is desired.

**Key Words.** Carbaryl; Permethrin; *Dendroctonus brevicomis*; *Dendroctonus ponderosae*; *Ips confusus*; Ponderosa Pine; Lodgepole Pine; Pinyon Pine.