

ARBORICULTURAL ABSTRACTS

TYLOSES AND GELS ASSOCIATED WITH CELLULOSE ACCUMULATION IN VESSELS ARE RESPONSES OF PLANE TREE SEEDLINGS (*PLATANUS* × *ACERIFOLIA*) TO THE VASCULAR FUNGUS *CERATOCYSTIS FIMBRIATA* F. SP *PLATANI*

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Stems of plane tree seedlings were cytologically investigated regarding the involvement of tyloses and gels in defense reactions to *Ceratocystis fimbriata* f. sp. *plantini*, the canker stain disease agent. In the lumen of infected xylem vessels, cytochemical tests revealed the occurrence of compounds labeled for cellulose and which seem to be involved in gel formation. Immunogold methods indicated that pectin-rich material accumulated in the paramural area of vessel-associated parenchyma cells and around tylosis walls. Tylosis formation and deposition of pectin-containing gels were associated with metabolic changes of vessel-associated parenchyma cells. It is suggested that parenchyma cells play a key role in the defense of plane tree seedlings through plugging of xylem vessels leading to compartmentalization of the vascular fungus. (Trees. 2000. 15:25–31)

FIRE IN THE URBAN FOREST: LONG-TERM EFFECTS IN OLD-GROWTH STANDS

Robert E. Loeb

In the old-growth forests of New York City parks, fires contributed to black cherry (*Prunus serotina*), (*Sassafras albidum*), and oaks (*Quercus* spp.) having large increases in tree density over the past half-century and attaining dominance among saplings and seedlings. An old-growth urban forest in Cleveland, which showed no evidence of fire, had little change in tree density since 1935. Urban forest management practice would benefit from including fire-related activities such as planting fire-tolerant species in locations that direct within the urban forests and increasing public interest in protecting the forests from fire. (Arboric. J. 2001. 25:307–320)

THE EFFECTS OF CATIONS ON THE ACTIVITY OF THE GYPSY MOTH (LEPIDOPTERA: LYMANTRIIDAE) NUCLEAR POLYHEDROSIS VIRUS **Martin Shapiro**

Fourteen cations were tested at a 1% concentration (wt:wt), as chlorides, for their effects on the biological activity of the gypsy moth, *Lymantria dispar*, nuclear polyhedrosis virus (LdMNPV). Cupric chloride was toxic to gypsy moth larvae. Ferrous and ferric chloride were inhibitory to larval growth and development as well as to virus activity. Strontium chloride was inhibitory to virus activity but had no apparent effect on gypsy moth larvae. Six cations had little or no effect on virus activity (i.e., calcium, lanthanum, magnesium, nickel, potassium, sodium), whereas four cations (i.e., cobalt, manganese, ruthenium, zinc) acted as viral enhancers, as indicated by reductions in LC₅₀s. (J. Econ. Entomol. 2001. 94(1):1–6)

FERTILIZATION OF CONTAINER-GROWN BALDCYPRESS (*TAXODIUM DISTICHUM* (L.) RICH.)

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Two fertilizer experiments were conducted with first-year seedlings of baldcypress (*Taxodium distichum*) in containers (substrate = composted pine bark). First, seedlings were subjected to factorial combinations of dolomitic lime, soluble fertilizer (SF), and incorporated controlled-release fertilizer (CRF) (19.0N-2.6P-8.8K; 8- 9-month release). Lime decreased growth. Incorporated CRF [4.8 kg/m³ (lb/yd³)] yielded more growth than a single weekly application of SF (N = 0.5 g/L). In the second experiment, most of the potential height growth and total plant dry weight were realized with 2.4 kg/m³ (4 lb/yd³) and 4.8 kg/m³ (8 lb/yd³), respectively, or incorporated CRF. At optimal growth, foliar N concentrations were 3.0%. (J. Environ. Hort. 2001. 19(3):109–113)

EVALUATION OF DOGWOOD AND BIRCH SPECIES AND CULTIVARS FOR RESISTANCE TO KEY INSECT PESTS AND DISEASES

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Ten cultivars of dogwood (*Cornus* spp.) were evaluated in multi-year trials for relative resistance to the dogwood borer, *Synanthedon scitula*; cold injury; canker disease, *Botryosphaeria dothidea*; spot anthracnose, *Elsinoe corni*; and powdery mildew, *Oidium* sp., *Microsphaera* spp., and *Phyllactinia* spp. Similarly, eight cultivars of birch (*Betula* spp.) were evaluated for resistance to the birch leafminer, *Fenusa pulilla*; Japanese beetle, *Popillia japonica*, aphids, *Hamamelistes spinosus*; bronze birch borer, *Agrilus anxius*; and leaf-spot, *Cryptocline betularum*. All cultivars of *C. florida*, *C. kousa*, and *C. kousa* x *florida* were susceptible to dogwood borer, although the *C. florida* cultivars were surviving better than the others. *Cornus mas* and *C. Kousa* cultivars were relatively resistant to powdery mildew while the *C. florida* x *kousa* hybrids and *C. florida* 'Cherokee Brave' were intermediately resistant. *Betula platyphylla szechuanica* 'Purpurea' was highly susceptible to the bronze birch borer, whereas *B. nigra* and *B. nigra* 'Heritage' were the most susceptible birches to aphid damage. *Betula jacquemontii* was highly susceptible to Japanese beetle defoliation. *B. nigra* and *B. nigra* 'Heritage' were most susceptible to defoliation by birch leaf spot. This study suggests that dogwood and birch cultivars vary in susceptibility to key insect pests and diseases. Planting relatively resistant cultivars may be useful in managing perennial pests in urban landscapes. (J. Environ. Hortic. 2001. 19(3):73-78)

DETECTION OF ROT IN STANDING TREES BY MEANS OF AN ACOUSTICAL TECHNIQUE

D. Ouis

A technique is presented to allow the possible prediction of decay in the stems of standing trees. This acoustical technique is widely used to evaluate the "reverberation time" of rooms, a factor that is inversely proportional to the amount of absorbing material in the room. The notion of reverberation time may then be extended to any vibrating system. The investigation of the application of this technique to trees was inspired from woodmen's operation of "sounding" trees. This is an operation that consists of analyzing by the ear the response of a tree when struck by a hammer on its trunk. In this respect, the function of main concern is the vibrational response of the tree trunk. First, the technique was tested in the laboratory where studies were conducted on freshly hewn logs of spruce. Then it was implemented in a small field study on standing trees to predict the presence of decay in their stems. A tree is considered a mechanical system with proper vibration characteristics. A shorter reverberation time for a decayed tree would be expected compared to that of a tree with sound wood. Instead, the reverberation time was found to be longer for a decayed tree, contradicting the results found from the studies on the wood logs. Moreover, the reverberation time for trees was found to be relatively short, and other indications point to the existence of some coupling between the vibrational modes of the tree. It was also found that more information on the health status of the tree could be obtained from its frequency response. (Arboric. J. 2001. 25:117-152)