

ARBORICULTURAL ABSTRACTS

Cold Hardiness of *Phellodendron sachalinense* Friedr. Schmidt Seedlings Increases with Age

Steve McNamara and Harold Pellett

Seedlings of several landscape tree species frequently experience cold injury at temperatures that are noninjurious to older specimens of the same species. However, there are few published reports quantifying age-related differences in hardiness. In this study, the stem cold hardiness of a mature, 35-year-old female Sakhalin corktree was compared with that of half-sib seedling progeny of different ages. Ten-, 22-, and 34-month-old seedlings were hardy to -4C on 9 Oct., while the 35-year-old parent withstood -12C. Ten-month-old seedlings exhibited no further increase in hardiness on 26 Oct., whereas the 34-month-old seedlings and the mature parent were hardy to -16C. The 22-month-old seedlings were intermediate in hardiness on this date. The 10- and 22-month-old seedlings had died back to the snowline by late January, but the 34-month-old seedlings and the mature tree were uninjured. The corktree seedlings did not attain midwinter hardiness levels comparable to the adult tree until the winter following their fourth season of growth. The absence of flower buds on cold-tolerant 4- and 5-year-old seedlings suggests that physiological maturation is not a prerequisite for full expression of the cold acclimation capability of this species. (HortScience 2000. 35(2):304-305)

Preference of Temperate Chinese Elms (*Ulmus* spp.) for the Adult Japanese Beetle (Coleoptera: Scarabaeidae)

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Trees of newly acquired *Ulmus* species originating from the temperate regions of China and growing at The Morton Arboretum, Lisle, Illinois, were evaluated in no-choice and multiple-choice laboratory bioassays and cage-studies for feeding preference for adults of the Japanese beetle, *Popillia japonica* Newman. *Ulmus lanceaefolia*, *U. prunifolia*, *U. pseudopropinqua*, and *U. taihangshanensis* were less preferred for feeding by adult Japanese beetles. No-choice, multiple-choice, and cage feeding studies revealed that *Ulmus wallichiana* was moderately preferred, and *U. procera* and *U. americana* were highly preferred for feeding. Dry fecal pellet weights were strongly correlated with the percentage of leaf tissue removed. Feeding preference in the multiple-choice study was strongly correlated with feeding preference in the cage study and in the no-choice study. Likewise, adult feeding preference in the cage study was strongly correlated with preference in the multiple-choice and no-choice studies. The less-preferred species of *U. lanceaefolia*, *U. prunifolia*, *U. pseudopropinqua*, and *U. taihangshanensis* show promise for future elm breeding programs. (J. Econ. Entomol. 2000. 94(2):445-448)

Effect of Transplanting on Water Relations and Canopy Development in *Acer*

Amy J. Barton and Christopher S. Walsh

Transplanting large-caliper trees frequently leads to poor tree growth and survival. A longitudinal study of the changes in water relations and canopy development was conducted to study this effect. Pruning and watering were used to test the recovery of maple trees following transplanting. Water potential (ψ), transpiration rate (t_r), and leaf area index (LAI) were the measured dependent variables. In the summer after transplanting, date and treatment significantly affected LAI, t_r , and mid-day ψ in *Acer truncatum*. In this species, trees receiving a post-transplant pruning treatment in combination with watering did not significantly differ in t_r and mid-day ψ from non-transplanted controls, although LAI did differ between these treatments. In both *A. truncatum* and *A. tataricum ginnala*, treatment and day interacted significantly on pre-dawn ψ . While the seasonal patterns differed between species, the most negative pre-dawn ψ measurement were made 4 months after transplanting. In the spring following transplanting, significant differences due to prior-year treatment were again measurable in mid-day ψ in leaves of *A. tataricum ginnala*. In that species, mid-day ψ of the transplanted control trees differed from nontransplanted controls. Transplanting led to a measurable, long-term water stress. Pruning and watering in combination partially relieved that stress. Leaf area index was markedly affected by transplanting. It

is suggested that this readily-measurable variable could be useful in assessing recovery from transplant stress. (J. Environ. Hortic. 2000. 18(4):202-206)

Consumers Preferences for Plant Size, Type of Plant Material and Design Sophistication in Residential Landscaping

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How much value do consumers place on a good landscape? Self-selected attendees to a Detroit, Michigan, flower show indicated that plant size was the most important factor in the perceived value of a landscape. Holding other factors equal, increasing from the smallest size plant generally available for installation to the largest size defined in our study increased perceived home value by 5.0%. Design sophistication was almost as important as size. Holding other factors equal, upgrading from a traditional foundation planting to a sophisticated design that incorporated multiple bed and curved bedlines increased perceived home value by 4.5%. The type of plant material used was the least important. The relative importance of plant material selection as a factor contributing value added to the home by the landscape was almost half that of plant size and over 40% less than design sophistication. The conjoint model produced from 158 survey responses predicted that from the least valued landscape to the most valued landscape the perceived value of the home increased 12.7%. (J. Environ. Hortic. 2000. 18(4):224-230)

Evaluation of Organic Landscape Mulches: Composition and Nutrient Release Characteristics

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A 12-month field experiment was undertaken on a sandy loam soil to investigate nutrient content and nutrient release characteristics of six organic landscape mulches: cocoa shells, coarse conifer bark chips, wood chips, garden compost, horse manure, and finely ground conifer bark. Comparisons were made against black polythene mulch and a bare earth control. Mulch treatments were applied to bare soil plots, left for 12 months, and then cleared before sowing a crop of agricultural mustard (*Sinapis alba* L.). Soil analysis was carried out at the start and end of the experiment; fresh and dry masses of the aerial portion of the mustard crop were determined and their nutrient contents assessed. Initial mulch pH was not a good indicator of how that mulch would affect the underlying soil pH over time. After 12 months, the organic mulches had either no significant effect on soil pH or increased it slightly relative to unamended soil. In contrast, initial nutrient content of the organic mulches proved to be a useful indicator of their impact on available nutrient levels in the soil and of their relative benefits to plant growth. Horse manure, garden compost, and cocoa shell mulches, with low C:N ratios and high potassium content, resulted in significant increases in soil nutrients and supported the highest yields. After 12 months, no evidence of nitrogen immobilization or growth suppression under the wood or bark-based mulches was observed. None of the mulches has a significant effect on the underlying soil organic matter content during the experiment. (Arboric. J. 2000. 24:175-187)

Effects of Pollarding and Weather on the Incremental Trunk Growth of Common Lime (*Tilia ´ europaea*) in an Urban Context

Peter J. Jarvis and Jeffrey P. Marlow

Cores were taken from the trunks of 35 pollarded and 35 unpollarded lime trees (*Tilia x europaea*) in Kidderminster, Worcestershire, and annual growth rings were measured. The act of pollarding led to an initial growth spurt then, for a few years, a relative decline in trunk growth rate. Data suggest that weather, especially temperature and rainfall regimes of the preceding seasons, together with a range of site effects, including inter-tree spacing and soil, had a greater impact on annual trunk growth than pollarding. It was difficult to ascertain any convincing environmental relationships with nonpollarded trees. (Arboric. J. 2000. 24:139-153)