ARBORICULTURAL ABSTRACTS

RESPONSE OF FIVE WOODY LANDSCAPE PLANTS TO PRIMO AND PRUNING

Mack Thetford and James Berry

The use of Primo (trinexapac-ethyl) was investigated as an alternative to pruning of container-grown woody ornamental species. A foliar spray of 469, 938, or 1,407 ppm (0.5, 1.0, or 1.5 oz/gal) was applied to pruned plants. A nontreated control (water) and an industry control [Atrimmec (dikegulac-sodium)] were included for comparison. Monthly mechanical pruning or no pruning treatments were imposed during the production period. Monthly pruning alone reduced the height of euonymus, forsythia, Chinese privet, and azalea. Efficacy of plant-growth regulator treatment differed among the five species. Primo was not effective in suppressing the height or trimming dry weight of forsythia, Chinese privet, or waxleaf privet and provided only a transient suppression of euonymus and azalea. (J. Environ. Hortic. 2000 18(3):132–136)

SHOOT AND ROOT GROWTH OF THREE TREE SPECIES IN SIDEWALKS

Jason Grabosky, Nina Bassuk, Lynn Irwin, and Harold Van Es

Three tree species (*Tilia cordata, Acer campestre*, and *Malus* spp.) were grown in a standard sidewalk pavement profile, an experimental sidewalk profile (SSM), and in the field. Root systems in the paved treatments were harvested after 3 years to analyze root length, root density, and profile distribution. SSM tree foliage quality (measured by SDAD 502) and shoot extension measured in the 2nd and 3rd years were not different than those of the field control trees. Tree foliage quality and shoot extension were reduced in the standard sidewalk profile. There was an increase in root length of *Acer* and *Tilia* in the SSM profile versus the standard sidewalk profile and an increase in depth of the root zone for all species. The results indicate several advantages in root and canopy growth for street trees grown in the experimental profile compared to the standard sidewalk pavement profile. (J. Environ. Hortic. 2000 19(4):206–211)

TAXONOMIC BASIS FOR VARIATION IN THE COLONIZATION STRATEGY OF ARBUSCULAR MYCORRHIZAE FUNGI

Miranda M. Hart and Richard J. Reader

Arbuscular mycorrhizae fungi (AMF) are important components of terrestrial communities, but the basic ecology of individual AMF, including their colonization strategy, remains unclear. The colonizing behaviors of 21 AMF isolates from three families (Acaulosporaceae, Gigasporaceae, and Glomaceae) were compared to test for a relationship between AMF taxonomy and colonization strategy. Both the rate and extent of colonization were considered by measuring percentage root colonization, root fungal biomass, soil hyphal length, and soil fungal biomass over 12 weeks. Most Glomaceae isolates colonized roots before Acaulosporaceae and Gigasporaceae isolates. The fastest colonizers were also often the most extensive. Taxonomic differences were apparent in the amount and proportion of fungal biomass found in roots versus in soil. Glomaceae isolates had high root colonization but low soil colonization. Gigasporaceae isolates showed the opposite trend, whereas Acaulosporaceae isolates had low root and soil colonization. These results were similar for four different host plants. The results indicate that the colonization strategies of AM fungi differ considerably and that this variation is taxonomically based at the family level. Arbuscular mycorrhizae fungal taxonomy therefore has a functional basis. (New Phytol. 2002. 153:335–344)

THE TENSILE STRENGTH OF ISOLATED WOOD RAYS OF BEECH (*FAGUS SYLVATICA*) AND ITS SIGNIFICANCE FOR THE BIOMECHANICS OF LIVING TREES

Ingo Burgert and Dieter Eckstein

Wood rays of beech trees were isolated with the aid of a new kind of milling technique, and their strength was directly measured using microtensile testing. The unexpectedly high tensile strength of approximately 75 MPa in dry conditions leads to the supposition that, besides the known physiological functions of substance storage and conduction, the ray parenchyma also make a contribution to the biomechanics of living trees, which had been previously underestimated. (Trees. 2001. 15:168–170)

GROWTH, DRY WEIGHT, AND NITROGEN DISTRIBUTION ON RED OAK AND "AUTUMN FLAME" RED MAPLE UNDER DIFFERENT FERTILITY LEVELS

Jill Larimer and Daniel Struve

Red oak (*Quercus rubra* L.) seedlings and 'Autumn Flame' red maple (*Acer rubrum* L.) rooted cuttings were grown under different fertility levels: 0, 25, 50, 100, 200, or 400 mg/liter N from 20N-8.6P-17K water-soluble fertilizer applied daily in two, 45-minute irrigation events. At 1-month intervals from June to October, seedlings were harvested, and dry weights and N content of leaves, stems, and roots were determined. In October, red oak dry weight increased up to 400 mg N/L fertigation. Red maple dry weight was greatest between 200 and 400 mg N/L fertigation. For both species, as N fertigation increased, relative stem dry weight increased while relative root dry weight decreased. There was little change in relative dry leaf weight. For both species, percentage N in leaf, stem, and root tissues increased with increasing N fertigation. N distribution in leaf, stem, and root tissues was similar to relative dry weight accumulation. Red maple plants had greater morphological adjustment to increasing N fertigation than did red oak plants. At the highest fertigation levels, red maple plants could be N loaded, increasing N tissue concentrations without an increase in plant dry weight. Red oak plants did not exhibit N loading. (J. Environ. Hortic. 2002. 20(1):28–35)

BACTERIA FOUND ON AMERICAN CHESTNUT BARK AND THEIR POTENTIAL IN BIOCONTROL OF CHESTNUT BLIGHT

Patricia C. Groome, Terry A. Tattar, and Mark S. Mount

The American chestnut *(Castanea dentata)* became susceptible to a blight fungus *(Cryphonectria parasitica)* in the 1870s. This fungus was imported on seedlings from Asia, and American chestnut had no resistance to it. Since then, all attempts to eradicate or control the disease have met with failure or very limited success. This paper briefly reviews the history of the biocontrol of chestnut blight, from the use of "hypovirulent" strains of *C. parasitica* to the use of a bacterium of *Castanea* spp. that are 1) antagonistic to *C. parasitica* and 2) can survive for an extensive time period on the bark of *C. dentate.* The study reveals that some *Bacillus megaterium* isolates from *C. dentata* bark may have potential in biological control. The results also provide an explanation for the success of mud packs in "healing" cankers. (Arboric. J. 2001. 25:221–234).