ARBORICULTURAL ABSTRACTS

POPULATION STRUCTURE OF DOGWOOD ANTHRACNOSE FUNGUS

N. Zhang and M. Blackwell

Anthracnose, caused by *Discula destructiva*, affects several native dogwood species in North America, especially flowering dogwood in the east and Pacific dogwood in the west. The fungus behaves as a recently introduced plant pathogen under episodic selection. Two distinct disjunct groups of fungal isolates corresponding to eastern and western groups were detected by amplified fragment length polymorphisms and sequences of the intergenic spacer (IGS) of the nuclear ribosomal DNA, translation elongation factor-la, and p-tubulin genes. Of 20 genotypes identified among 72 isolates, 17 genotypes were from the eastern United States (n = 50), but only three were present among the western isolates (n = 22), indicating that the eastern population may be more diverse. Most eastern and western isolates belonged to a few widespread clones, and the genetic variability of this apparently asexual fungus was remarkably low compared with that of many other asexual fungi. We conclude that *D. destructiva* is still under intense selection pressure and that episodic selection may still be in effect. The New York City area, a possible epidemic center in the east, had relatively higher genetic variability than samples from other areas. (Phytopathology 2002. 92:1276–1283)

TRANSPLANT TIMING AFFECTS EARLY ROOT SYSTEM REGENERATION OF SUGAR MAPLE AND NORTHERN RED OAK

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Description of early post-transplant root growth will help formulate best transplanting strategies for landscape trees. In this experiment, the dynamics of early root system regeneration of sugar maple (*Acer saccharum* Marsh. 'Green Mountain') and northern red oak (*Quercus rubra* L.) were determined. Field-grown 4-year-old trees were transplanted bare-root into outdoor root observation containers (rhizotrons) in October 1997, November 1997, or March 1998. All trees were grown in the rhizotrons until October 1998 and then transplanted, with minimally disturbed root balls, to field soil and grown for an additional 2 years. October-transplanted trees of both species began root regeneration earlier and regenerated more roots, as judged by accumulated root length on rhizotron windows, than November- or March-transplanted trees. Median date for beginning root extension for sugar maples was 48, 22, and 0 days before budbreak for October-, November-, and March-transplanted trees, respectively. Median date for beginning root extension for northern red oak was 4, 21, and 14 days after budbreak for October-, November-, and March-transplanted trees, respectively. Height and trunk diameter growth were similar for all treatments within each species for 3 years after application of treatments. Early fall transplanting will result in earlier first season post-transplant root growth for sugar maple and northern red oak. Earlier post-transplant root growth will likely increase resistance to stress imposed by harsh landscape environments. (Hortscience 2002. 37(6):984–987)

GENETIC EVIDENCE FOR NATURAL HYBRIDISATION BETWEEN THE DUTCH ELM DISEASE PATHOGENS *OPHIOSTOMA NOVO-ULMI* SSP. *NOVO-ULMI* AND *OPHIOSTOMA NOVO-ULMI* SSP. *AMERICANA*

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The Dutch elm disease pathogen *Ophiostoma novo-ulmi* is separated into subspecies *novo-ulmi,* formerly known as the Eurasian (EAN) race, and subspecies *americana,* formerly known as the North American (NAN) race. Both subspecies occur in Europe, and hybrids between them are suspected to have emerged in parts of Europe where their ranges overlap. Authenticated isolates of both subspecies were examined in order to determine whether fixed mutations occur in the cerato-ulmin *(cu)* and in the colony type gene *(col*1*)*. One and six mutations were detected between subspp. *novo-ulmi* and *americana* in *cu* and *co*l1, respectively. The mutation in *cu* and one mutation in *col*1 proved to be located within restriction sites, and were used for PCR-RFLP. This method provides a quick and reliable diagnostic method to differentiate the two subspecies. Seven isolates of *O. novo-ulmi* from Austria were suspected to be hybrids between subspp. *novo-ulmi* and *americana,* and were tested by PCR-RFLP of their *cu* and *col*1 genes. Two of the suspected hybrids from Austria (isolates AT73 and AT146) had the *cu* PCR-RFLP profile of ssp. *americana* and the *coil* PCR-RFLP profile of ssp. *novo-ulmi.* Furthermore, a ssp. *novo-ulmi* tester isolate from Poland (P150) showed a similar hybrid pattern. This is the first evidence revealing recombination between two genes and thus hybridization between the two subspecies of O. *novo-ulmi* in nature. (Plant Pathol. 2002. 51:78–84)

ARCHITECTURE OF SILVER MAPLE AND ITS RESPONSE TO PRUNING NEAR THE POWER DISTRIBUTION NETWORK

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The architectural analysis of silver maple (*Acer saccharinum* L) in natural environments has revealed the sympodial nature of its growth, the three levels of organization that govern the development of its stems through an alternation of organization plans (hierarchic and polyarchic), as well as the characteristic traits of the three architectural units involved and of the four categories of differentiated axes. The growth responses of silver maple alongside streets were analyzed in four pruning contexts associated with tree position relative to the wires of the power distribution network. Data reveal that with increasing pruning pressure, the percentage of the crown composed of suckers becomes higher, as does their growth rate, indicating a greater disorganization of the structure of the crown. Silver maple is naturally capable of developing a low fork with limbs that have hierarchic development. However, the pruning has promoted the reverse, which is the appearance of a high fork and, after repeated prunings, a more polyarchic development of the crown, increasing the threat that trees represent for wires. (Can. J. For. Res. 2003. 33:726–739)

RESISTANCE TO LOCUST LEAFMINER (COLEOPTERA: CHRYSOMELIDAE) IN BLACK LOCUST

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Locust leafminer, *Odontota dorsalis* (Thunberg), activity was observed for 2 years on 70 black locust, *Robinia pseudo acacia* L., trees grown from seed collected from its native range. Four black locust seedlings from Tennessee had low numbers of eggs, larvae, pupae, and mines, and were selected for clonal propagation. These clonal propagules were resistant to locust leafminers collected from three different counties in Maryland. This resistance was also observed in controlled choice and no-choice tests in outdoor screen houses. Adults showed different ovipositional preferences for black locust trees from different seed sources, which were reflected in lower numbers of larvae, pupae, and mines in resistant clones. It was concluded that antixenosis and antibiosis were involved in the mechanisms of resistance to the locust leafminer in black locust. (Econ. Entomol. 2003. 96(1):53–57)

EFFECT OF TREE SHELTERS ON GROWTH AND GAS EXCHANGE OF FOUR TREE SPECIES UNDER FIELD AND NURSERY CONDITIONS

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One-year-old seedlings of sawtooth oak, white oak, green ash, and flowering dogwood were evaluated to determine the effect of tree shelters on survival, growth, and gas exchange. Trees were grown under both field and container nursery conditions. Shelters had a significant impact on survival of field-grown trees, but not on containerized, nursery-grown seedlings. Overall survival was approximately 75% and 40% for sheltered and nonsheltered, field-grown trees, respectively. Sheltered plants had approximately a 90% survival rate, and nonsheltered trees exhibited approximately 80% survival in a nursery situation. In the field, sheltered trees had greater height growth and biomass production than nonsheltered trees. However, sheltered plants exhibited a decrease in total biomass in the nursery study, the majority of which was reflected in an overall 62% reduction in root production in the sheltered trees. Photosynthesis of sheltered trees averaged 65% of nonsheltered trees and internal leaf CO_2 was approximately 11% greater in sheltered trees. Shelters appear to benefit field-planted seedlings by providing physical protection and shade, therefore enabling the tree to better survive stresses from ambient conditions. In nursery situations, shelters may only be helpful in training attractive trees with less labor. (J. Environ. Hortic. 2002. 20(2):96–100)