

## MUNICIPAL ARBORIST'S PANEL

Chairman: Ralph Veverka, Cleveland, Ohio

On behalf of the administration of the city of Cleveland, I would like to welcome all of you. My predecessors and I have received a lot of help and support from others in the nursery industry and municipal arboriculture in achieving what we now have in Cleveland. We have between 100 and 125 different varieties or species that have been planted over a period of 25 to 30 years. It's a real trial and error situation which is perfect for evaluating the performance of these trees under actual street situations. We saw many of the different plantings on the tour yesterday and I'll be showing slides of some of them today. Your comments, criticisms, and helpful hints will certainly give support to our program.

Rather than limit my presentation to five trees, I would like to show slides of some of the trees we looked at on the tour. Some of these I would certainly recommend be used more extensively.

Acer saccharinum (silver maple). -- I agree with Bill Collins when he says this tree has its place and that we should be selecting some improved varieties of it. We have a planting of silver maple on Lucille Avenue. It is in a wide tree lawn and we have had few losses and no problems with heaved sidewalks or clogged sewers. If we did have problems, we would remove them. I remember one time we had a very serious outbreak of cottony maple on these trees. I took samples to an arborist's society meeting in Columbus and asked for advice on controlling the problem. Somebody in the audience recommended using the power saw. Under the circumstances, though, the people like them and we are leaving them there.

Zelkova serrata (Japanese zelkova). -- This planting on one of the main streets of our west side is over 25 years old. When the trees were first planted, we found some serious problems in the crotch areas with what appeared to be necrotic canker. We thought the trees were doomed, but as they became established and acclimated they began to thrive and they outgrew the cankers. We lost very few and since then we have had few problems. It has a very nice vase-shaped habit that is similar to the American elm we were replacing at the time.

Nyssa sylvatica (black gum, sourgum). -- This planting in the Brooklyn area is just tremendous. It is approximately 19 years old, very uniform! and there have been few losses. Their coloration is very nice and they are growing well.

Ulmus carpinifolia 'Christine Buisman' (Christine Buisman smoothleaf elm). -- On this street, we replaced American elms with a combination of zelkova and Buisman elm. The Buisman elm is serving its purpose, but it really does not have the broadness that the zelkova develops. So it does not make a good substitute for American elm, but fortunately it is hardy and resistant to Dutch elm disease.

Eucommia ulmoides (hardy rubber tree). -- This tree has held up very well for us in Cleveland. It has no serious problems and requires little maintenance. We noticed some dieback this year which we believe is due to the severe winters we have had the last couple of years. Its rich green rubbery type foliage is its most attractive characteristic.

Crataegus oxycantha 'Paulii' (Paul's scarlet English hawthorn). -- We have stopped planting this tree because it was a constant fight between the woolly aphids and the tree--the woolly aphids finally won. We think there are other hawthorns that are probably more useful and require less maintenance, but I'm not sure which they are.

Fraxinus pennsylvanica 'Marshall's Seedless' (Marshall's seedless green ash) -- We have planted this extensively throughout the city of Cleveland. The borers don't like it, it's a fast grower, and it's hardy. The only problem is it tends to get open with age. I wish there were still better varieties available. There are a lot of ash varieties available, but it seems the others we tried just didn't make it. We had heard a lot about summit ash and started to put some on our streets. Then I happened to be at a nursery that had a block that were 4-5 inches in diameter. From a distance, they looked just beautiful, but up close it was evident they were borer infested. You know if they are borer infested in the nursery, they would be especially hard hit along the streets.

Koelreuteria paniculata (golden rain tree). -- Our planting of golden rain tree has proven to be very hardy and especially attractive. They have nice yellow spring blossoms and their seed pods are attractive. They have not put on the growth I think they should, but they are not suffering either. One problem we had was they required a lot of maintenance and corrective pruning to make them street trees.

Liquidambar styraciflua (American sweet gum). -- We have some fairly good sized trees in our sweet gum planting--16 to 20 inches in diameter. We were concerned about them after one of our recent severe winters because when spring finally came they remained dormant for 4-6 weeks longer than they should have. But once the ground warmed up they started

growing and we haven't had any problems since.

Alnus cordata (Italian alder). -- This has been an exceptional tree for us. It is surprisingly hardy, has very attractive foliage, and its upright form make it suitable for a variety of urban uses.

Pyrus calleryana 'Chanticleer' (Chanticleer callery pear). The callery pear varieties are nicely compact and pyramidal when young but do open up when they get larger. Another problem is they are susceptible to fireblight.

Celtis laevigata (x occidentalis?) (sugar hackberry). -- The people on the tour agreed that this was an excellent tree that should be used more. There is no witches broom on it. We have noticed some leaf gall, but it has been a minor problem.

James Evans, State College, Pennsylvania

I would like to begin by saying that I feel each of the trees mentioned has its own merits--as far as I am concerned there is no super tree. Every tree has to be evaluated and matched to the characteristics of the site where it will be planted.

Carpinus caroliniana (American hornbeam). -- The American hornbeam makes an excellent small tree when trained to a single stem. It is an ideal tree for use under utility wires or in a small place to be landscaped. The hornbeam has year-round interest. **It** has a dense foliage made up of delicately shaped dark green leaves that turn orange to red in the fall. Its relatively smooth slate grey bark is irregularly fluted and very attractive in the winter. One drawback of this tree is that-it does not transplant bareroot very easily. They should be moved balled in burlap. Once established it grows in a wide range of soil conditions and it does well in urban environments.

Castanea mollissima (Chinese chestnut). -- Since the advent of the chestnut blight disease the USDA has been encouraging the planting of this species. Its nuts are suitable for eating and it is resistant to the disease. Chinese chestnut has a round head, often as broad as it is tall, so it should only be used in a wide planting strip or in parks. It has lustrous dark green foliage in the summer and yellow to bronze fall color. It produces showy creamy white flowers in June. I feel this is a good street tree that could be better if selections were made for reduced numbers or sizes of fruit and for more upright forms.

Cladrastis lutea (American yellowwood). -- Attractive flowers, foliage, and bark make this an exceptional shade tree. The fragrant white flowers are in extremely showy 12 inch pendulous clusters that superficially resemble black locust or wisteria. The compound foliage is dense and bright green in the summer and a very pretty yellow to orange in the fall. Its ascending branches form a beautiful round, domed top. The form is accentuated by the beech-like silvery gray bark on the trunk and older branches. Although the yellowwood normally has low crotches, it can and should be trained to form a long single stem. It should be pruned when in full leaf because it bleeds profusely when pruned in late winter or spring.

Corylus colurna (Turkish hazel). -- This well shaped pyramidal tree has gray-brown flaky bark. Its male catkins appear in late winter or early spring and are quite attractive. The foliage is a deep green and remains so during the dry summer month when the leaves on other trees like maple scorch.

Oxydendrum arboreum (sourwood). -- Though slow growing, this is my favorite tree. Its fragrant white flowers are pendulous, similar to its relative the Japanese pieris, and are produced in mid-July. It has lustrous dark green summer foliage and brilliant scarlet autumn color. When young, it is somewhat loose and open, but develops a rounded top and drooping branches with age. Oxydendrum is related to rhododendron and like rhododendron it prefers acid soil, but seems to do well under either neutral or acid conditions. In State College, we have alkaline soils but these are grown as street trees and they are doing quite well.

Bluett C. Green, Jr., Maryland Department of Transportation, Brooklandville, Maryland

The development of metropolitan tree plantings which are functional, aesthetically pleasing and require a "reasonable" amount of maintenance is the goal of city arborists, "urban foresters" and highway landscape departments across the nation. The planning, installation and establishment of tree plantings which effectively perform the various functions envisioned by the designer, requires considerable evaluation of the planting site and careful selection of plant materials which are adaptable to the microclimate of the proposed planting site.

A "careful" and "honest" evaluation of metropolitan tree planting sites reveals that we are attempting to grow trees under the most inhospitable conditions imaginable. The past and present wholesale destruction of the natural environment resulting from the extensive construction activities undertaken within our metropolitan areas leaves a

legacy of planting conditions under which no tree is naturally equipped to survive. The trees we plant are challenged to endure under conditions of unnatural soil profiles, extensive soil compaction, poor or non-existent drainage, unreliable ground water supplies, air pollutants, deicing chemicals, extremes in temperature fluctuations, excessive heat reflected from surrounding structures, reduced sunlight resulting from shadows cast by adjacent structures and unnatural photoperiods produced by certain forms of street lighting.

We, the metropolitan tree "experts," must strive to communicate with those persons responsible for the development of metropolitan construction projects to educate them with regards to the environmental requirements that must be provided if we are to establish and maintain populations of trees to complement and complete the 'man-made structures of the metropolitan environment. This approach, if properly and professionally pursued, can provide for future planting sites which are more hospitable to trees. But, what about our present situation?

We, the tree "experts," are expected to provide trees which can successfully perform under the adverse growing conditions which have been created by metropolitan development. Development which has been undertaken in the name of providing environmental surroundings which are supposed to be advantageous for human development. Perhaps these conditions are conducive to human development. But, we all know that trees are adversely affected by them.

Our arsenal is the vast selection of plant materials available in our nation's nurseries and arboretums, but is this enough? I submit that we are doing battle with a "slingshot" when what we need is a "Big Bertha." The plants now being grown for the most part have been selected for aesthetic qualities when what we need are trees selected for superior performance under adverse environmental conditions. We must seek and produce trees which cannot only tolerate but "thrive" in the unnatural metropolitan environment. These superior trees of the future may be here now. We need only search them out. That one maple, oak or ash which consistently outperforms other similar trees may possess superior genetic qualities which enabled it to acclimate to its unfavorable growing conditions and thrive in spite of them. We need to be searching out trees which are not simply different. We need to find and develop trees which are better.

We need trees which are better equipped genetically to

cope with all of the adversities that the metropolitan environment has to offer. They must have vigorous root systems capable of functioning under extreme soil conditions; the capacity to adjust to fluctuating moisture and turf conditions; and resistance to insects, diseases and a multitude of pollutants. This is a very large challenge but one which can and must be met.

We have the opportunity to provide future generations with genetically superior trees that are able to thrive in the metropolitan environment; to provide those that follow us with a total environment which will be more acceptable for human development as well.

Cladrastis lutea (American yellowwood). -- A handsome specimen tree with attractive flowers and foliage and good form. It lends itself well to pedestrian scale-plantings. We've had some very good success with it in urban areas. One thing that someone else brought out was pruning. In the nursery, you want to trim the branches when they're as small as possible because they are slow to heal.

Kalopanax pictus (Castor-aralia). -- It is an interesting plant that is easily propagated and grows rapidly. It blooms in the summer and produces attractive fruits.

Larix decidua (European larch). -- This rapidly growing tree has a unique sort texture. Its primary attribute, though, is its tolerance of moist soils. We use it wherever we have a drainage problem.

Phellodendron amurense (amur corktree). -- A hardy, tough tree that withstands a range of adverse conditions including poor soil and polluted air. It should be used with caution because it is wide spreading.

Quercus acutissima (sawtooth oak). -- This oak transplants well and grows rapidly. It retains its foliage into the winter and provides a year-round screening effect.

Styrax japonicum (Japanese snowbell). -- This small tree flowers in the summer when few other trees are in bloom. It is a handsome specimen tree that has pleasing year-round effect. It needs good soil but has few insect or disease problems.

Robert S. Miller, Dayton, Ohio

Its been very interesting listening to all the speakers today. They have named quite a few of the trees I had

considered including in my list--Turkish hazel, male Kentucky coffeetree, katsuraturee, dawn redwood, Chanticleer pear, and male Ailanthus.

In my opinion, it is not practical to plant the same kind of tree down anyone street because of the variety of conditions that exist along streets--overhead wires, street lights, traffic lights, existing trees in lawns, building setback, etc. With that in mind, in Dayton we try to plant the tree that is best suited for the particular site. We indicate the size tree we want for the site by placing it in a height and width category. The three height classes are short (less than 20 feet), medium (between 20 and 40 feet), and tall (greater than 40 feet). The width categories are narrow (less than 20 feet), medium (between 20 and 35 feet), and broad (greater than 35 feet). So we have nine different categories of trees we plant, and we mix them freely--we plant whatever is right for the spot. We will not plant a small narrow tree on a wide tree lawn. We plant as large a tree as possible. I've seen in other cities where small flowering trees were planted on 10 feet wide tree lawns. I would not do that.

Now to my selections. Except for one that has already been mentioned, my five choices are different from all the others.

Acer griseum (paperbark maple). -- This deciduous tree from western China has outstanding seasonal qualities. It has copper to cinnamon-brown exfoliating bark from its trunk and branches. The leaves are small with three leaflets, dark green and hairy above and bluegreen and hairy beneath. They turn a deep red in the fall. At maturity, it has a crown width of 20 feet. It is difficult to propagate, is a slow grower, and is not readily available.,

Maclura pomifera (osage orange). -- The thornless and seedless varieties that have been developed must be used. It is a medium/broad deciduous tree ranging from Texas to Massachusetts. It has few insect or disease problems, is exceptionally hardy, and has strong wood. Its bark is orange colored and its leaves are a shiny green in the summer and bright yellow in the fall.

Phellodendron amurense (amur corktree).-- This medium/broad type deciduous tree from North China and Japan is hardy as far north as Massachusetts. It is heat and drought resistant and appears to have few insect problems. It seems to grow well in any but very moist soils. Amur corktree has corky bark, massive branches with large, opposite pinnate leaves that are dark green and shiny above and glabrous beneath. It has yellow fall color.

Eucommia ulmoides (hardy rubber tree). -- A tall/medium type deciduous tree, **it's** relatively free of insect and disease problems and tolerates urban conditions. The foliage is leathery and glossy in appearance and turns yellow in the fall.

Taxodium distichum (common baldcypress). -- A tall deciduous conifer that varies considerably in width. It grows well on either wet or dry soils, The foliage is feathery pale green and turns reddish brown prior to falling. It is relatively free of insect problems and it appears to do well in the urban environment. It is resistant to wind and ice damage. Its natural range is from Delaware south to Florida and west to Missouri and Texas.

#### Questions for the Municipal Arborist's Panel

Jim Sherald: Jim, I believe both you and Bud mentioned Cladrastis, and it is one of my favorite trees, too. But unfortunately, in Washington we find that most of our yellowwoods have cankers--its Botryosphaeria I believe. In some cases, this kills as much as half the tree. I was wondering if you or anyone else has seen the same thing.

Jim Evans: I have not seen it.

George Ware: I think late pruning could be the cause of **your problem**. Yellowwood closes wounds slowly so the smaller the pruning cut the better. With careful pruning you can almost eliminate the problem.

Bud Green: We planted them in Dayton and had no problems, but a local nursery did. The severity of the problem may depend on the source of the plants.

Larry Kuhns: A comment on the Phellodendron. The **trees I have** seen were very broad spreading and often branched low. They were hard to limb up high enough to be street trees. They were hardy and a good tree in other respects, but too low-spreading for streets.

Davis Sydnor: In the shade tree evaluation project, the **losses of that** particular plant have been very high. Growth has also been poor--six years after planting they are no more than 18 inches taller than they were when they were planted. I think they require a lot of fertilizer after they are planted.

Bud Green: I think that the problems mentioned for both the yellowwood and corktree are related to source.

You should have some assurance that wherever the plants came from they were grown well. We as the consumers should control our purchases. We shouldn't buy and accept plant material from just anybody. I believe we should inspect the trees at the nurseries we buy from. A nursery we buy from has a very good selection of corktree and with a little bit of management in growing it initially it develops a high head. And we have had no problem with poor survival after transplanting. You should even go so far as to learn the history of your plant material. When we want to buy red maples we ask the nurseryman where he got his liners. All too often they're from Alabama or Tennessee and I don't want those. I want trees grown from a northern source. You have to be professional in your approach and avoid failures due to poor sources.

George Ware: At the Morton Arboretum, we have had more luck with *Phellodendron lavalleyi*, which is the Japanese corktree. It's more upright and the fall color persists longer. It's planted more in our area because the landscape architects have chosen it over *amurensis*. I suspect that *lavalleyi* would be the better tree farther east too. It's true that it does not grow rapidly for us, but the uprightness and persistent fall color are certainly good qualities.

Frank Santamour: George, I'd like you to repeat here some of the comments you made on the tour about the introgression of *Celtis* species.

George Ware: In the eastern United States, we ordinarily accept two species of *Celtis*--*occidentalis*, the northern hackberry and *laevigata*, the sugarberry or southern hackberry. But again it's a situation parallel to the maple. These trees have a broad range of transition from Tennessee across to Arkansas and up into southern Illinois. In the vicinity of Interstate 70 you can't tell what some of the hackberrys are--they are completely intermediate. But they combine some very nice qualities. Some are unaffected by witches broom and nipple gall. It's possible to go into southern Illinois and select superior types right out of those hybrids. In nursery catalogues, there are many varieties with southern Illinois and Missouri listed as their source. They will list four or five *occidentalis* varieties, and they will all possess *laevigata* qualities. They will list four or five *laevigata* varieties and they will all possess *occidentalis* qualities. This broad range of transition is very nice for horticulturists because it produces a good variety of material to select from. The street trees we saw yesterday were very nice. I superficially evaluated

them as being *Celtis laevigata*, but they were definitely intermediate types.

Bill Flemer: We seem to be selling more and more *Pyrus calleryana* "Bradford" every year. We have been increasing production 10 percent per year and every year we sell out. It scares me because I feel it is getting to the point that the American elm was 50 years ago. I would like the panel to comment on what's good and what's bad about it. Should we be cautious in growing and selling such tremendous quantities, or is it really the dream shade tree?

Jim Evans: I have heard that we should not be planting any more than 10 percent of one genus on our streets. An inventory of the streets in State College showed that 60 percent of our trees are maples and 40 percent are sugar maples. Verticillium wilt, maple decline, and scorch are real problems for us now. So it is my feeling that we should limit our plantings to 10 percent of any one genus and 5 percent of any one species.

Davis Sydnor: If memory serves me correct, we have five varieties of *Pyrus calleryana* in our shade tree evaluation project--Bradford, Chanticleer, Faurie: Rancho, and Select. The worst of these is Bradford. It is the most variable, least true to type and hardest to transplant. We've only been evaluating eight of each, but in the case of Bradford it took 16 to get 8 that survived. With the others, we've had almost no losses. Again, it could be a problem with source, but I doubt it. I have talked to a lot of other people that have been planting Bradfords and their results have been similar. It is possible that at this point there are sports of Bradford that are being propagated just because of the sheer numbers. Others would be much more likely to be true types because we have smaller numbers of them. We also have experienced more wind-throw with Bradford than with the others.

Frank Santamour: Davis, are all of the Bradfords propagated by grafting them onto *calleryana* rootstocks?

Davis Sydnor: They are all budded trees.

Ralph Veverka: In my slide presentation, I showed a planting of Callery pear. It was from this planting that the Chanticleer variety was selected. But you may have noticed the difference in size of the trees. That was due to replacement of trees that died. There has been a lot of loss due to fireblight, and there is some fireblight now. I think the Bradford is more resistant to it and that maybe

we should plant the Bradford more. As far as planting a lot of one species I believe that is a mistake; you end up with an attractive nuisance. We did that with Norway maple and have been sorry because we now have a tremendous problem with aphids on them. We had a lot of elms and they got cleared out by Dutch elm disease.

Ed Murriner: My comment is directed to Jim Evans. We have some other types of chestnut that are not susceptible to the blight. One of them is the Japanese variety, which is similar to the Chinese. There is also the native American chestnut called the chinquapin that is not subject to the blight. It's a small tree, maybe not more than 15 feet, but like the Chinese, it is not as susceptible as the American. We still have a lot of it growing in the Appalachian mountains. A lot of it comes up from stump sprouts.

Bob Miller: I like the idea of limiting the percentages of each genus and species planted on our streets. But I don't think they have to be set so high. There are so many different kinds of trees to plant that you could go down to one or two percent of any one species and still be okay. Our major disease and insect problems are occurring where we have solid plantings of one kind of tree. I know they are beautiful in flower and leaf, but we have more problems with that kind of a situation than where the species are mixed. It is more natural to have a mixture of varieties. You wouldn't want to buy a house where every house is the same, so why put your trees in that situation. Fireblight on a street that has block after block of pears is bound to wipe them out. I have seen block after block of elms and block after block of maples wiped out. I now mix up my plantings.

Bud Green: Oxydendrum was one of the proposed trees. It is native in Pennsylvania and native in Virginia, but it has never been recorded as naturally occurring in Maryland. When we plant it, we have all sorts of results from spectacular to dead, I would love to know why. It doesn't seem to be source related. We have tried different nurseries in Pennsylvania, New Jersey, and Virginia and none of the nurseries provide plants that are consistently good.

Jim Evans: I don't know why you would have that problem.

Jean-Guy Perras: I have a feeling that when you have a lot of unexplainable variation in the success of your plantings that some of the trees are being planted too deep. When we

have a problem with trees dying the first thing I do is dig around the trunk. Fifty percent of the time I find the tree is planted too deep.

Jim Evans: Along those same lines. The people who plant our trees are often from the street department, and they really don't care a whole lot about trees--they just want to get the job done. They may spin the roots around in the hold so that they don't have to dig the holes so deep. This leads to girdling roots and a high mortality.