

ARBORETUM PANEL

Chairman: R. Henry Norweb, Jr., The Holden Arboretum, Mentor, Ohio

The trees I've selected grow at the arboretum and have some special attributes for which they should be grown more frequently. They have interest at more than one time of the year and they do well in urban situations. They are more tolerant of adverse conditions in some instances than we generally think.

Parrotia persica (Persian witch hazel). -- This tree is reputed to grow to 40 feet in height although I don't believe it will grow that tall in this part of the country. Wyman says the flowers are insignificant, but I disagree. Though they are very small they have red stamens with brown bracts and they appear in late winter or early spring before the leaves are present. In the sunshine, it is a magnificent sight. The biggest disadvantage of the tree is that it requires quite a bit of work in the nursery to train it to a tree form. It is naturally a multi-stemmed plant and will develop a shrub growth habit. But with careful pruning in its younger years, it will become a well-shaped tree with a thick trunk--a good tree for a small city garden. Its greatest attribute is its foliage. In the summer, it is shiny and in the fall it is a mixture of reds, orange, and bronze. Its fall color is consistently exceptional regardless of changes in climate from year to year. The Persian witch hazel also has a good gray mottled bark that makes it attractive in the winter. This is a characteristic that is especially important in this area of the country because our landscapes tend to be dull in the winter.

Picea omorika (Serbian spruce). -- In my mind, this is the finest of the spruces. It has an exceptionally narrow form, brown branches, and its cones are an-attractive cinnamon color. A production problem is it is slow growing compared to some of the other spruce species. As a point of interest, the needles of Serbian spruce are flat, unlike other spruces. It is reported to have a tap root and fibrous side roots, but in our heavy soil it never develops the tap root. We have had no trouble moving the tree. In its native Yugoslavia it grows on alkaline soil, but we have observed no problems with it where it is growing in acid soil.

Pterostyrax hispidus (Chinese or Japanese epaulettetree). -- This is a vigorous growing tree that also reaches about 40 feet in height. Its major attraction is in the spring when it flowers. In June, it is covered with large pendulous panicles that are creamy white and very fragrant. The fruits

produced are small and inconspicuous but winged. This gives it its name *Pterostyrax* rather than the better known *Styrax*. Its bark character is not mentioned in any literature as being especially attractive. However, it does seem to develop frost cracks rather than any exfoliation, and they give it an interesting winter appearance.

Quercus imbricaria (shingle oak). -- Not a terribly common tree, but it seems to do well in our part of the country even under city conditions. It has a fine symmetrical shape with slightly pendulous branches. Its leaves are interesting for an oak, because they are complete and look more like a mountain laurel than a typical oak leaf. The leaves are a dark green above and white under, and produce an interesting shimmering effect when the wind blows. In the fall, they turn a russet red color. The tree holds its leaves through the winter. It is reported to be hard to transplant because of a tap root with few laterals. However, again, the heavy soils in our part of the country prevent the tap root from forming and we have had little difficulty moving trees up to two inch caliper.

Stewartia pseudocamelia (Japanese Stewartia). -- This tree has several outstanding attributes. It flowers in June, which is a little later than most of our flowering trees. The flowers are large, creamy white with yellow stamens, and produced quite profusely. I believe for that time of the year it can be as dramatic and interesting as the *Franklinia* is in its season. Another important characteristic is its cinnamon colored exfoliating bark. It is especially attractive in our dull gray winter around here.

Peter W. Bristol, The Holden Arboretum, Mentor, Ohio

Carpinus japonica (Japanese hornbeam). -- Most of you are familiar with the Carolina hornbeam. The Japanese hornbeam is different in that it has a vase-shaped or fan-shaped growth habit. We have a 25-year-old tree in our collection that was misplaced and is growing in a low wet heavy clay soil. Its about 15 feet tall and because of its habit it can be limbed up so that a person can walk under it. It would be a very appropriate tree for a tree lawn. The leaves of the Japanese hornbeam are longer and narrower than those of the Carolina hornbeam, they have a yellow-red-brown fall color, and are sometimes persistent. Like the Carolina hornbeam, its bark is smooth, gray, and fluted, producing good winter effect.

Acer buergerianum (trident maple). -- The unusual three-lobed leaves make this tree unique for a maple. When I checked our trees yesterday, they were turning a rich burgandy

brown--a dark color similar to those of Nyssa. This too is a small tree that **grows** only to about 40 feet. We received our tree, which is about 15 feet tall, in 1954, from Princeton Nurseries, so it is about 25 years old. It can be limbed up and it has excellent winter characteristics. It has an interesting growth habit and a flaking bark with orange underneath.

Quercus petraea 'Columnaris' (upright northern English oak). -- Often mistaken for Quercus robur rastigiata, this tree is the pride and joy of the Holden Arboretum. It is much superior to Quercus robur. First of all, I have yet to find one spot of powdery mildew on it. Our tree is 25 years old and it has been exposed to heavy snows and ice storms and I haven't found one broken branch on it and it has never opened up. If grown from seed a certain percentage will come up fastigatn, but in most cases it is grafted.

Alnus glutinosa 'Pyramidalis' (upright European black alder). -- This tree has great promise but has not been planted much at all. It's a fast grower that is a possible replacement for the lombardy poplar. Our tree is 22 years old and 35 feet tall. It will tolerate wet conditions. As a matter of fact, if I didn't have my boots on yesterday **when I** checked the tree, I would have gotten thoroughly **soaked**. It is growing in a swamp, but doing very well. Again, this tree has not opened up for us as fastigate trees sometimes do. At 35 feet tall, it's only 6 feet wide and still growing straight up. Like on many other trees, the leaves were chewed on this year. Though we have not done any cultural spraying for them, we have not found bark aphids **or** leaf miners on it. I suspect it will probably get leaf miners, though.

Maackia amurensis (amur maackia). -- This is a small tree that is usually multi-stemmed to a short trunk. Its white flowers were very striking this year. Their effect is especially nice because they come in June when few other trees are in flower. Our tree is 25 years old and 15 feet tall and should ultimately reach 45 feet. Its red exfoliating bark is similar to that of the tree lilac and gives the plant a very nice winter character. I feel that because of its size and character it would be a good substitute for a crabapple. I have seeds collected from our tree that you may take with you. The seed is a soft-coated legume and a typical scarification or stratification can be used to break its dormancy.

T. Davis Sydnor, The Ohio State University, Columbus, Ohio

Cornus officinale (Japanese cornel dogwood). -- A relatively small tree, ~~it~~ is only a little bit larger than the more common cornus mas. The two are very similar but I chose Cornus officinale for this situation primarily because of the difference in scale. It matures at a height of about 30 feet and grows almost as wide. It is a relatively slow grower. The flowers are yellow and appear in early April. Its edible scarlet fruit falls in September which creates one of its disadvantages. Yellow jackets and honey bees are attracted to the fruit. In its defense, it does not fruit heavily very often so it is not so much of a problem as it might be. Like many of the dogwoods its autumn color is wine. It has a rather attractive growth habit, and for a small plant it can be limbed-up well. They can be grown either single or multi-stem. A multi-stemmed plant would of course reach saleable size in considerably less time. Its foliage texture is medium but it casts a dense shade. The flowers are showy only because they appear so early, They are one of the first trees to flower which is kind of nice. Another asset of Cornus officinale is its bark is rather attractive.

Crataegus punctata 'Ohio Pioneer' (Ohio Pioneer dotted hawthorn). -- This relatively small tree, which can be expected to grow to about 30 feet in height, was introduced by the Secret Arboretum. For a small tree, it has a fast rate of growth when young--more than two feet per year. When mature the Ohio Pioneer hawthorn can be expected to have the same growth habit as the species, which has a very attractive horizontal form. Its shaggy bark resembles that of Ostrya virginiana. It flowers nicely, but I do not consider them to be a primary asset because they are borne after the foliage is well developed and for the most part are hidden. The fruit is a dull red and it falls in September. The reason for including it in this group is, like most hawthorns, it grows well and tolerates an awful lot of environmental abuse. That is a very real asset that we must consider a great deal more in the future. The other good news is that this plant is only very lightly armed. The thorns on it are few and far between and it can be considered essentially thornless. Though we did not spray it, there was little Japanese beetle injury, even though some nearby trees were totally defoliated. Only about 10 percent of the foliage was damaged and that occurred only after the beetles had eaten everything else they preferred. We have seen no other insect problems on them and they are only slightly susceptible to fireblight.

Magnolia kobus (kobus magnolia). -- A rapid growing tree, it reaches roughly 75 feet at maturity. It tends to be upright or pyramidal when young, but becomes rounded with age. Its white flowers are borne very early in the spring and regularly suffer a lot of frost damage. When it does

flower well it is quite spectacular, but if I were selling this plant, I would not sell it as a dependable flowering tree. But I would still recommend it as an excellent plant to grow even if it never flowered. It has nice form and foliage, it has a tremendous tolerance to soil compaction, and it possesses good insect and disease resistance. It grows very well in the type of restricted, confined spaces typical of urban tree sites.

Tilia tomentosa (silver linden). -- We did not spray the trees in our shade tree evaluation plot this year because we wanted to see if any of the lindens were-not preferred hosts for Japanese beetles. The assumption has always been that all lindens were heavily attacked. However, we found they do not like silver linden. Silver lindens growing right next to plants that were totally defoliated lost less than 30 percent of their canopy. Some of them had less than 10 percent of their foliage eaten. As far as producing shade in a hurry, lindens are generally a bad bet, but silver linden grows about 50 percent faster than most of the little leaf lindens. Like most other lindens it is relatively pyramidal when young, but it develops a rounded crown more rapidly than most. Its flowers are yellow and fragrant in June and they do attract bees. There are reports in the literature that the pollen of silver linden is detrimental to the bees. The foliage is deep green above and pale below, and in a breeze the shimmering effect produced is very attractive. It has a medium texture and produces quite dense shade. Like other lindens it is tolerant of adverse environmental conditions.

Ailanthus altissima (tree of heaven). -- One of the reasons I selected this one was to stir people up. In most cases, it is never considered for planting, yet I remember a meeting held here several years ago. I was talking to the mayor and he said his favorite tree was tree of heaven. Being a horticulturist, I was offended by such a stupid statement and asked him why. He said it was because the tree of heaven was the only thing that stayed green in the Huff district. This is not a bad recommendation for a plant--it stays green in the Huff district. After all, there may be a few other Huff districts that need help. This is a tree that can take the worst that man has to offer. It has a tenacity that allows it to grow out of cracks in pavement or in debris on the side of a building. In addition to its ability to survive, it has several other attributes. Its foliage is a lustrous green and its fruit can be quite attractive. There are male and female plants and I have got mixed emotions over which is preferred. The male flowers are supposed to be vile smelling and should be avoided, but

the female produces an abundance of seeds which can become a nuisance. I believe if we could put up with a little odor for a few days and avoid the seedling problem, the male selections would be preferred.

George Ware, The Morton Arboretum, Lisle, Illinois

The criteria I set for my selections was the trees must do well in the upper Mississippi Valley or midwest. I can work best with trees in my own region because they are the ones with which I am most familiar. I also decided that rather than make my selections based on aesthetics and then consider environmental durability, I would select them based on environmental durability first. All of my selections should do well in the Huff district.

I would like to begin by talking about acer saccharum, sugar maple, and show you what can be considered a complex species. For horticultural convenience, we could separate it into four or five species and that would probably be the most practical approach.

(Dr. Ware showed a slide which depicted the variation in leaf patterns present in sugar maple and related species.) The leaf patterns here show that there is a great deal of difference between leaves taken from trees from different parts of the range of sugar maple. I've included acer grandidentatum, which is actually considered separate, to introduce the idea that provides the rationale for my talk.

A few days ago a person brought in a leaf sample of sugar maple he said was from Missouri, and I asked if by any chance it was 'from Carthage. He was quite surprised and asked how I knew. I knew by the shape of the leaf, because the leaves of sugar maple give us the best indication of just about any species of where the tree came from. Leaves on trees from New England have a multiplicity of tips. This trait grades off to the west to the Iowa maple which is completely different.

Acer saccharum var. nigrum [black (sugar) maple]. -- This could also be called acer nigrum (~~black maple~~) or Iowa sugar maple. Black maple is quite a bit **different from** the other sugar maples, and there is a particular reason why I am interested in it. I keep reading that in the east sugar maple is troubled by leaf scorch. In Illinois, we may get some scorch at the time of transplanting, but after that it is no problem. When we examine them, we find that our Illinois sugar maple is not the same as those growing in the east. In Illinois, the leaves are thicker and more leathery and the plants are more drought resistant. In Iowa, these traits are even more pronounced. The cutinization, waxiness, and shape

Of the leaves, and the ability to withstand drought and adversity is much greater in the Iowa maple or black maple. We can plant this tree along streets or other difficult places with considerable confidence that it will survive. It ordinarily has yellow fall color, but in years in which the climate favors development of good color, anything from yellow to orange to red may develop. Black maple can be a large tree in the western part of its range, but in the east it does not grow quite so tall. It is native to alkaline soils, so it grows well in them.

It is sort of my belief that the urban situations in the east--the constricted root space, the wind tunnels, summer heating, and adverse soils--in some ways resemble the conditions in the open countryside of Iowa or Missouri. Those trees long adopted to the Iowa countryside are going to be more durable than the countryside trees of New Jersey taken into New Jersey cities. This long evolutionary selection process in Iowa creates a more durable kind of tree, and this is the story I would like to relate to several other species.

Acer rubrum var. Drummondii (Drummond maple). -- The range of this plant is all up and down the Mississippi Valley. Of course, those from the northernmost part of its range would be the most important to us. I was attracted to this tree by the city forester of New Orleans, who said they grew a lot of them because they thrived in alkaline soils. I was very surprised to hear that because our problem with red maple in Illinois is alkaline soil induced chlorosis. After investigating the plant, I found it was an alkaline resistant ecotype, variety, or another species. It is a definite ecological entity that is found on gumbo soils and places with poor aeration, like swamps.

The leaves have a shape similar to red maple, but are much larger. The large leathery leaves are deep green and glossy, with felt-like vestiture on the underside at least during the early part of the growing season. Its form is pyramidal to oval with coarser branching than that of red maple. The large red fruits are borne in great profusion, creating a spectacular spring-time display. Fall color may also be spectacular with a range from red to orange to yellow. It has a deeply fissured bark pattern on old trees that is quite picturesque.

Drummond maple is probably hardy to zone 5, but its hardiness has scarcely been tested. Its tolerance to alkaline, clay soils is a significant horticultural attribute.

There is full justification for calling *Acer rubrum*

Drummondii **Acer Drummondii**. I am not just suggesting a species, but a reservoir of genes from which selections could be made. My interest was greatly sharpened when in southern Illinois I kept finding Drummond maple genes in silver maple trees along streets in towns. As I drove through these towns, I saw silver maples with a much darker green color than any I'd ever seen before. When I inspected them, I found all the traits of the Drummond maple in them--darker green, glossy, leathery leaves and the felt-like undersides. There has been some genetic infiltration into silver maple, and as far as I can tell into red maple too. I believe this ecological type has a lot of-credentials for surviving typical urban sites.

Fraxinus tomentosa (pumpkin ash). -- For many years, we have been planting ash trees that have shown few or no problems at the Morton Arboretum. *Fraxinus tomentosa*, like *Acer Drummondii*, comes from alkaline, swampy areas where few other things will grow. By now you can see my pattern. If a tree can grow in a swamp, in clay soils, where there is little or no aeration, it should be able to survive in compacted soils. But these soils are not always saturated. In the summer they dry out and expose the tree to almost desert conditions. So this tree is not just tolerant to poor aeration, it is tolerant to a wide variation of conditions.

Its range is from the floodplains of the lower Mississippi Valley far up into the Wabash Valley in Indiana. It has a pyramidal to oval-shaped crown, developing from a single dominant trunk. The foliage is leathery and lustrous, with the undersides often hairy. Its fall color is a subdued reddish-purple to purple with prominent glossiness until leaf drop. We have seen no ash decline or borer problems as yet, but I say that with caution.

Gymnocladus dioica (Kentucky coffeetree). -- Attractive, hardy, and durable, this tree is native to a large area of central and northeastern United States. The species is dioecious; female trees produce conspicuous, coarse pods up to 25 cm. in length. Again, I suggest it is a reservoir of genetic material from which selections can be made. In Illinois, upright specimens can be commonly found. Upright, podless varieties could be easily propagated from root cuttings and would be worthy of considerable use. Though Kentucky coffeetree grows slowly initially, after 4 or 5 years its growth is quite rapid.

The foliage of Kentucky coffeetree has an elegant, finely-textured, tropical look with brilliant rich yellow fall color. When the foliage falls, a sparsely and coarsely branched tree is revealed. Specimens with upright branching

habit have a more compact winter silhouette in contrast to the picturesque profile of most coffeetrees. All forms are attractive.

Ulmus parvifolia (Chinese elm). -- Sometimes called lacebark elm or littleleaf elm, it has a vast natural range in Asia and thus is comprised of populations adapted to a wide range of climatic conditions. The appearance of trees--branching patterns, size of leaves, bark patterns, etc.--vary greatly in specimens from seeds from different parts of its natural range. There are limitations to the hardiness of this elm in the northcentral states, but testing of the hardiness of seedlings from the northernmost part of its range has scarcely begun.

Its deep green and glossy leaves are quite leathery. Certain forms have much larger leaves than others. Red fall color is a feature seen now and then. Branching patterns vary greatly as does the coarseness of branching. Certain crown forms resemble American elm.

This elm is quite drought resistant and tolerant of clay and alkaline soils. **It** is also highly resistant to Dutch elm disease.

Questions for the Arboretum Panel

Bill Flemer: Was that *Quercus petraea fastigiata* in your slides? Certainly it was not the straight species.

Peter Bristol: Yes, it was *Quercus petraea* 'Columnaris'. The species is broader.

Tom Perry: **Just a comment.** The problem with Japanese beetles has been mentioned. In visiting various American cities, a major problem I have seen are sapsuckers and the damage they do to ash. There appears to be varietal differences in how well ash trees resist or tolerate sapsucker damage. Some are severely damaged while adjacent trees are not.

Bill Flemer: George, how far north can you go with *Ulmus parvifolia*?

George Ware: Presently we have not exploited the hardiness of sources in China. There is a tree on the Ames Campus of Iowa State University that has been there for many years. On the other hand, trees tried at Brookings, South Dakota, have not survived.

Larry Kuhns: Are the desirable characteristics you

mentioned for black and drummond maples consistent enough from seed that they can be grown from seed, or would you recommend propagating them vegetatively?

George Ware: I think either way would be alright. Mr. Heard (on the Nurserymen's Panel) has a black maple collection and black maple is a component of a couple of Princeton introductions, Goldspire and Green Mountain. So the genes are being used already. But I like the population approach. The Carthage population in Missouri is kind of a maple Mecca, everybody knows about Carthage. There is an island of maples on a little limestone area and they color consistently every fall. For the people in western Missouri the Carthage pilgrimage is something that people talk about. I don't know how a Carthage maple would do in Minneapolis, but I know it would probably do well in most areas. There is also the possibility that its drought resistance may not be that important if exposed to prolonged wetness farther east. The rationale for selection is a good one though. Back to the original point, I believe the population approach, testing seedlings, would be a better way to get a more representative testing of how it will grow along city streets.

Ralph Veverka: Davis, could you give us an idea of what we may expect from some kobus magnolia we have recently planted in Cleveland? Should we be watching for scale? And do you think it is a hardy enough plant for midcity planting?

Davis Sydnor: Chad (L. C. Chadwick) says that he has **seen problems** with it with regards to cold tolerance. We have some growing on campus in Columbus and at the Secrest Arboretum (Wooster, Ohio), and if my memory serves me correctly, they have taken temperatures down to minus 20° F without any tip dieback. Of course, we're talking about more mature trees and not seedlings. I have no reason to assume magnolia scale would not be a problem on it. But it is a rather spectacular thing and can be controlled fairly easily because you know when a plant has magnolia scale. Its not like oyster shell scale which can be attacking the tree undetected. We have not seen necrotic canker or any other serious disease problems on it. It has good troth angle and should be a strong plant in withstanding storm damage. I have not seen them develop iron deficiency as much as magnolia virginiana or magnolia soulangeana.

Frank Santamour: We became a bit intrigued with Maackia amurensis a number of years ago. We harvested the seed from our specimens on the arboretum and tried to grow them. They were poor seedlings--they yellowed up in containers. After identifying a number of cankers on the mature trees, we crossed Maackia off our list. It's as simple as that!

Bill Heard: The Minnesota arboreta had wonderful luck with Maackia, so maybe the answer is the plant needs a more rigorous climate. Theirs is far different from what you have in-Washington.

Frank Santamour: We are talking about Maackia amurensis. Could you possibly be talking about Prunus maackii?

Bill Heard: No, Maackia amurensis.

Frank Santamour: Okay. I don't know who this follow Mack was, that came in as a genus and a species. I know that Prunus maackia does marvelous in Minnesota, I'm happy to hear the other one does, too. Perhaps our climate in the east is not rigorous enough for it.

Davis Sydnor: **There** really is such a thing as not having a severe enough climate. An excellent example is the Russian olive which does beautifully in the central part of the United States, but which is a liability in Ohio because of verticillium wilt and phomopsis blight. Apparently, when it is put in the harsher environment the diseases can't survive.