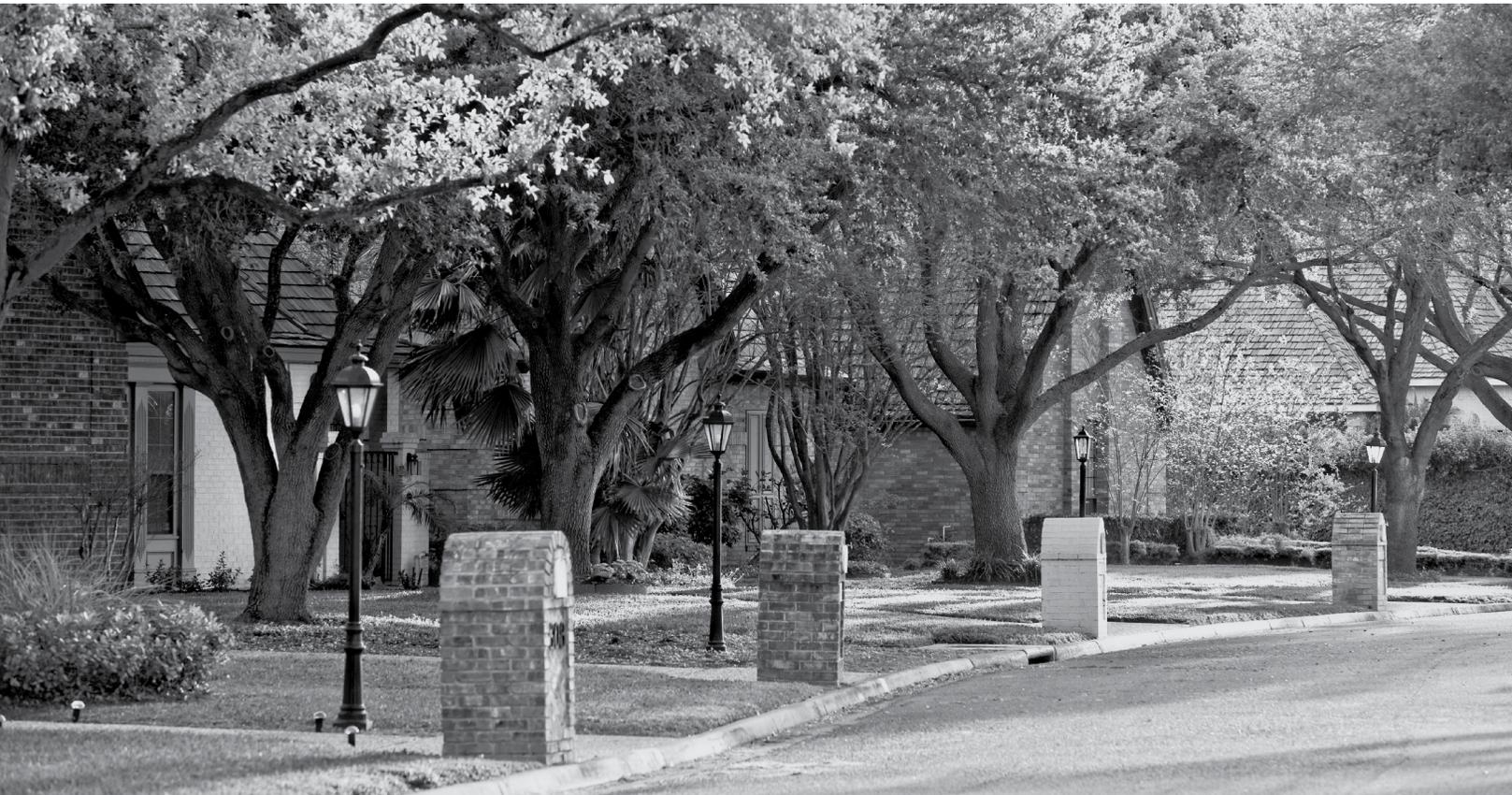




Understanding Landscape Cultivars

TREE CITY USA®
BULLETIN

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“Performance” seems like a strange term to use with trees, but that is exactly what is expected when we plant along streets or in parks and yards. Cultivars help deliver what is needed, usually through genetic improvements. Through an understanding of cultivars, trees and planting sites can be better matched, more benefits can be derived from trees, and money can be saved by having a healthier community forest.

In recent years, we have occasionally received questions about promoting the planting of any tree not native to the planting site. The position of the Arbor Day Foundation on this important point is that native trees are certainly the first ones to consider. However, today’s cities, full of concrete and buildings and people and cars, contain ecosystems that are often very different from “native” conditions. We need tree choices that work in urban ecosystems as they exist today — choices that include non-native species and

well-adapted trees if we are to have diverse, healthy community forests. While we encourage a high percentage of native species where they work best in urban settings, and natural preserves where possible to maintain diverse gene pools, we also recognize that landscape trees ought to join orchard and field crops in taking advantage of genetic technology that leads to improved performance.

As said so eloquently by tree expert Rick Henkel, formerly of Princeton Nurseries, “We are developing a whole palette of plant materials for landscape architects and others to use in the community.” From this palette, we can select not only for beauty, but for structural strength, pest resistance, drought tolerance, and other practical characteristics.

This issue of the Bulletin is intended to help you better understand the fascinating world of cultivars and what they can do for you.

What Cultivars Can Do

Cultivars have been developed for many reasons. Traditionally, these have been to make fruit production more profitable or to create something novel for the landscape market. Cultivars can also help solve problems related to planting sites. It is this use that has tremendous potential in urban and community forestry — along streets, in parks, and around public buildings. By selecting a cultivar with a trait that can solve a problem, it is possible to:

- Reduce the need for chemical pesticides, thus saving money, reducing environmental impacts, and preventing citizen complaints.
- Reduce maintenance hours, freeing crews to do more productive things like systematic pruning.
- Improve tree health, thereby reducing dead limbs and other public safety risks.
- Predict crown size and root space needs, helping to best match trees to specific sites.
- Enhance aesthetics through more diversity of flowers, foliage, and form — or where desired, through uniformity in plantings.
- Eliminate the nuisance of fruit dropping.
- Reduce removal costs by extending tree life.

Unfortunately, in almost all cases, there are trade-offs. Although there are cultivars available that offer all the advantages shown on these pages, each also has limitations. It is important to learn all the characteristics of a cultivar and avoid selections where the limitations outweigh the advantages.

✓ RESISTS DISEASE

Example: 'Sapporo Autumn Gold'
Hybrid Elm

Introduced by the Wisconsin Alumni Foundation in 1975; resistance to Dutch elm disease and verticillium wilt.



✓ TOLERATES DROUGHT AND REFLECTED HEAT

Example: 'Goldspire' Sugar Maple

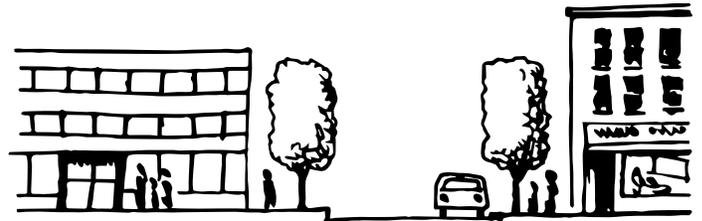
Resistant to the heat generated by nearby sidewalks and buildings and generally will exhibit leaf scorch less than other sugar maples.



✓ PROVIDES SHADE WITHOUT MESSY FRUIT/SEEDS

Example: 'Espresso' Kentucky Coffeetree

This is just one of several landscape cultivars that have been developed sans fruit. Seedless cultivars are especially appreciated by groundskeepers and homeowners who do not appreciate fruit dropping on walks and patios.



✓ HAS A CROWN FORM THAT FITS THE SPACE

Example: 'Armstrong' Red Maple

Cultivars may be selected from a wide range of crown forms as shown on page 3. 'Armstrong' red maple is a columnar tree with upright branching, making it suitable for narrow spaces.



✓ TOLERATES SALT

Example: 'Vaughn'
Hawthorn

A medium-size tree that tolerates a wide range of urban conditions, including deicing salt in the soil and the air.

✓ DISPLAYS UNUSUAL LEAF COLORS

Example: 'Autumn Brilliance'
Serviceberry

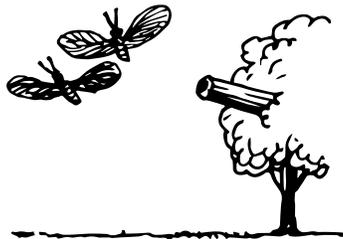


The foliage of this small tree emerges with bronze tints in the spring, matures to dark green from late spring throughout summer, and then turns brilliant red to orange-red in fall.

✓ GROWS RAPIDLY

Example: 'Siouxland'
Cottonwood

Introduced by South Dakota State University, this is a good choice for quick shade where space allows.



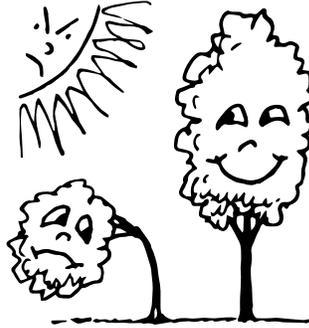
✓ RESISTS INSECTS

Example: 'Regent'
Scholartree

Introduced in 1964; resistant to leafhoppers.

✓ TOLERATES DROUGHT

Example: 'Greencolumnn'
Black Maple

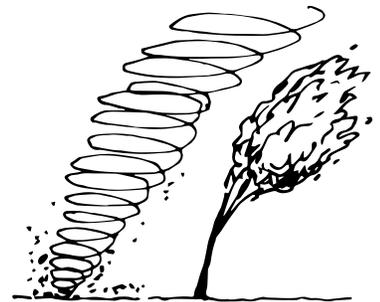


From the Midwest, this slow-growing cultivar has a narrow crown and tolerates heat and drought better than its close relative, sugar maple.

✓ EXHIBITS STORM-RESISTANT SHAPE

Example: 'Scarlet Sentinel'
Hybrid Maple

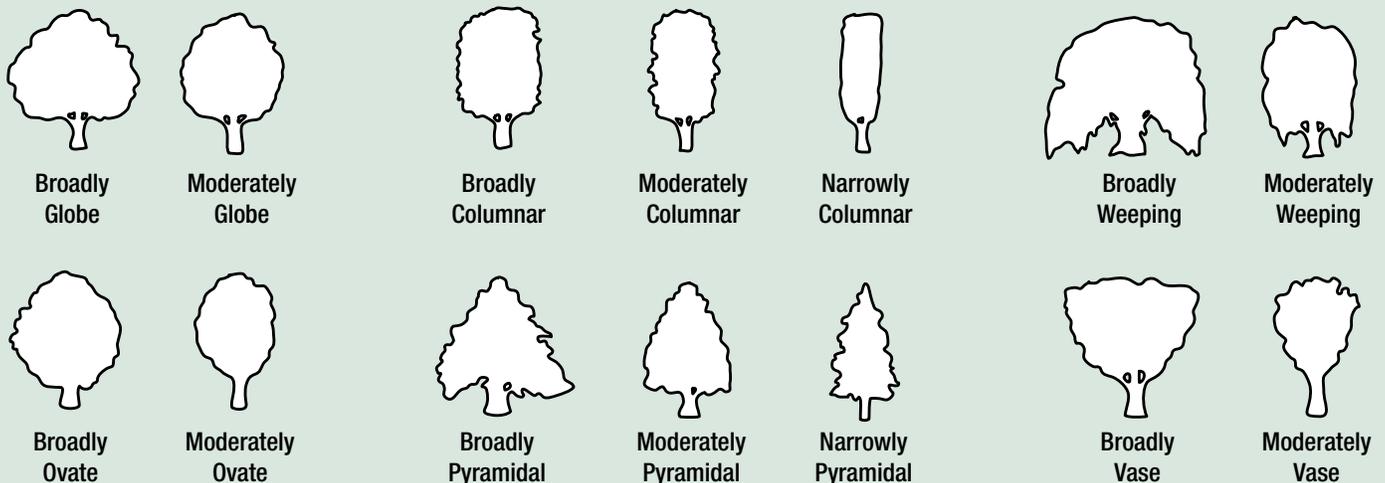
Where the vigor of silver maple is desired, but with less susceptibility to storm damage, this upright, fast-growing, narrow-columnar tree with ascending branches may be the answer.



SPECIAL ACKNOWLEDGEMENT to Kris Irwin, former Assistant Community Forester for the Nebraska Forest Service, University of Nebraska, for suggesting the topic for this issue and contributing to its content.

CROWN SHAPES

To help communicate accurately about cultivar characteristics, an attempt is made to standardize terms for foliage color, size categories, and other traits. Here are standardized crown categories used in the Directory of Landscape Tree Cultivars Project.



Some Basic Tree Terminology

Genus	A group of tree species that have fundamental traits in common but that differ in other, lesser characteristics.	<u>Example</u> Maple (Common Name) Acer (Scientific Name)
Species	A natural group of trees in the same genus made up of similar individuals that can produce similar offspring, some with minor variations.	Red Maple Acer rubrum
Variety	A subdivision of a species having a distinct, though often inconspicuous difference, and breeding true to that difference.	Acer rubrum var. drummondii
Cultivar	A variety, selected for one or more outstanding characteristics, that is being cultivated and usually reproduced by asexual means to preserve genetic makeup.	Acer rubrum 'Autumn Flame'

Superior Selection Also called superior trees, these are individual trees that display one or more notable, desirable traits.

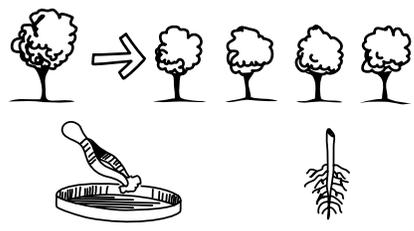


Hybrid A tree that results from mating genetically unlike individuals. Such a cross can occur in nature or artificially.



Clone A tree derived vegetatively from one parent, thereby being genetically identical to the parent tree.

Grafting and budding are also reproductive techniques used to develop clones, but complete genetic uniformity is not possible unless rootstock is part of the parent material.



Tissue Culture (micro-propagation) **Rooting of Cuttings**

Note: Some cultivars are developed from native trees; others from exotics.

The genetic makeup of cultivars is preserved through asexual propagation methods.

HOW CULTIVARS ARE DEVELOPED

Through the quirks or strategies of nature, trees with special features can show up anywhere. With a good eye and a lot of luck, you could spot one of these variations and develop a cultivar right in your own backyard.

Chances are that you will use cultivars rather than develop them, but to better understand how cultivars reach the marketplace, let's assume you are the person introducing one. The process could begin by noticing a beautiful baldcypress that has a perfectly straight trunk, deep roots, and none of the extensive stump flare that is common in that species. If cuttings

or grafts produce offspring with the same traits, proving that these features are locked into the tree's genetic code, you can give your "new and distinct" tree a name and even obtain a patent from the U.S. Patent Office. Holding a patent will give you exclusive control of the cultivar's propagation, use, and sale for a period of 17 years. A street tree with a handsome form of a baldcypress and no butt swelling would undoubtedly be prized by arborists and foresters for planting next to sidewalks. Therefore, your next move would be development and marketing. This would entail finding a nursery to start your cultivars (primary grower), one or more to grow them to merchantable

size (secondary grower), and as many retailers as possible to sell them to the consumer.

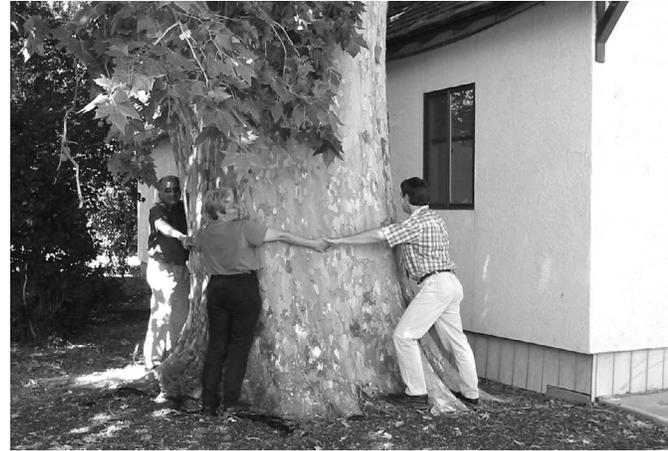
You will also need a trademark for your tree at this point, a name that is usually different than the cultivar name used in the scientific community and for your patent. For example, the cultivar name for a silver linden introduced in 1988 by Willet N. Wandell is patented as *Tilia tomentosa* 'Wandell.' Its trademark, however, is Sterling Silver Linden. This, too, is registered in the U.S. Patent and Trademark office. The advantage of having a trademark in addition to a patent is that this name is protected for your use or control for 10-year periods, renewable indefinitely.

KEEPING TABS ON THE BIGGEST TREES

There is a new awareness of the importance of the nation's largest trees. Not only are they an important part of our heritage, they may also contain genes that reveal secrets to their longevity. The ancient survivors also can be the source of cuttings or tissues for perpetuating them beyond the inevitable day of their demise.

Keeping track of the largest tree for each species is in itself a big job. The conservation organization American Forests has taken on this challenge and maintained a *National Register of Big Trees* since 1940. Volunteers locate and measure candidates for national champion status, and American Forests publishes the results annually. You may also access this information at www.americanforests.org/resources/bigtrees.

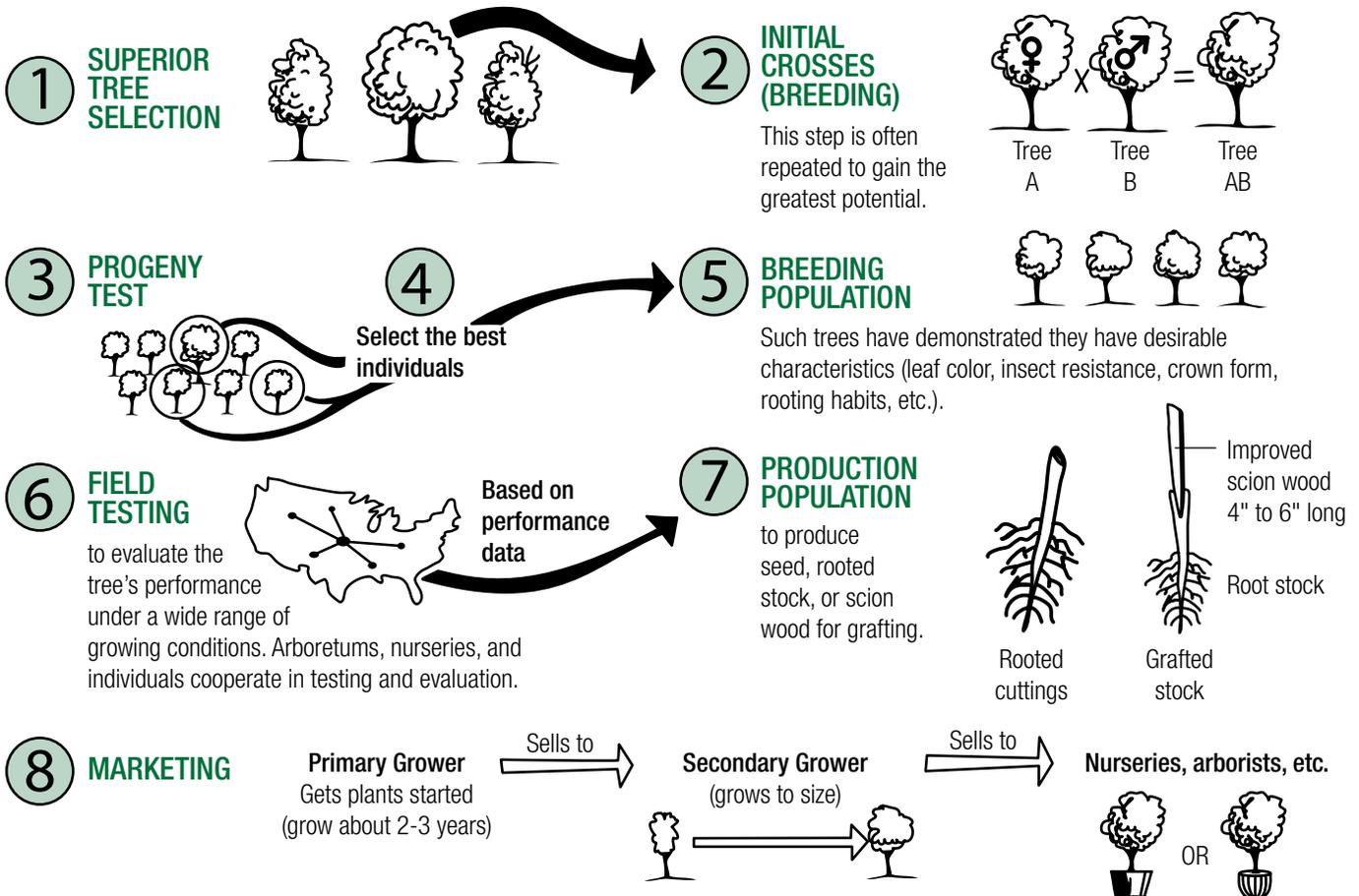
In addition to the national register, many states and even some cities maintain records of their own local champions. Your city forester or the forestry extension specialist at the land grant university in your state can tell you what program might exist in your state and how to obtain a list of the champs.



This magnificent London planetree in Eagle, Idaho, is the state champion for its species. Maintaining heritage trees like this can provide scientists with genetic material that might help in the development of long-lived cultivars.

THE GENETIC IMPROVEMENT PROCESS

New and useful cultivars come to the market in one of two ways. Sometimes they are discovered as naturally occurring varieties of a species. Other times they are developed by genetic improvement. Here is a simplified diagram of the selection and breeding process that taps the power of genetics to develop new cultivars.



Where to Learn More



Baileys Compact Amur Maple (*Acer ginnala* 'Compactum') is a cultivar of amur maple that is small, disease and insect resistant, and cold hardy. It is shown here as a landscape tree in Tidewater, Virginia.

People who are bewildered by cultivars often ask, “When I look at a cultivar, how on earth can I tell which one it is?!”

The truth is, if the tag is gone, you usually cannot identify a cultivar. Only if a cultivar has a unique leaf color or other showy trait or if it is widely planted in a particular area is it possible for most people to know its name at a glance. If it is one of the 700 crabapples that have been named, not even an expert can be sure.

Unfortunately, there is no single source of information about cultivars. In some cases, such as in the fruit or nut industries, commodity groups maintain information about cultivars. For example, to learn about nut cultivars, contact the Northern Nut Growers Association. For landscape trees, the search becomes more challenging. However, here are some sources of help.

Identifying cultivars is far more difficult than keying out or visually separating species. Candice Hart, an extension educator with the University of Illinois, suggests a handy way of remembering the cultivars you plant in your home landscape — whether trees or garden flowers. Municipalities, of course, can easily enter cultivar information in tree inventory programs at the time of planting. But homeowners can benefit from this simple two-step method:

- When you purchase the tree at a nursery, save the label that is attached to the tree.
- Place the label(s) in the pages of a loose-leaf photo album.



TREE CITY USA®

OPPORTUNITIES FOR TREE GROWTH AWARD

Adding appropriate new cultivars for planting in your community or publicizing cultivars that meet local needs, such as water conservation or planting in confined spaces, may help earn points toward a Tree City USA Growth Award. For more information about the requirements to earn this recognition, please visit arborday.org and type “Growth Awards” in the search box.

THE URBAN HORTICULTURE INSTITUTE

Room 134A Plant Science Bldg.
Cornell University
Ithaca, NY 14853
(www.hort.cornell.edu/uhi/index.html)

The stated mission of the Institute is to provide quality of life by enhancing the functions of plants within urban ecosystems. Its program integrates plant stress physiology, horticultural science, plant ecology, and soil science. Included in the application of this concept are the selection, evaluation, and propagation of superior plants, particularly for urban landscapes.

ARBORETA

To many people, an arboretum is a rather passive place, somewhere to stroll, enjoy the fresh air, and look at tree names. But some arboreta are far more. Among their services is the testing of non-native and genetically improved trees. From around the world they receive plant varieties and cultivars to try in their area and report the results back to the donors. Some arboreta also work on developing improved trees. Examples are:

The Morton Arboretum
4100 Illinois Route 53
Lisle, IL 60532

The Morton Arboretum has been focusing on the development of: disease-resistant elms, species adaptable to alkaline soils, small trees for planting under power lines, fruitless mulberries, fruitless box elders with greater wood strength, sycamores resistant to anthracnose disease, and various oak hybrids.

U.S. National Arboretum
3501 New York Ave., NE
Washington, DC 20002

Operated by the U.S. Department of Agriculture, the National Arboretum is a marvelous, 415-acre wooded enclave within the District of Columbia. Of its many projects, community forestry will especially benefit from its work to produce a disease- and insect-resistant elm and birch hybrid that can successfully resist attacks by the bronze birch borer.

SPECIES-ORIENTED SOCIETIES

Tree aficionados often form themselves into societies that keep close tabs on the development of cultivars. The Holly Society of America, the International Oak Society, and the American Rhododendron Society are good examples. Their services typically include education, research, and providing information about the varieties and cultivars developed from their species of interest.



Cultivars can create an embarrassing design problem when replacements are needed and records have not been kept. Uniformity can be maintained in a formal setting by keeping records of the cultivar's name and nursery source at the time of planting.

PROBLEMS TO AVOID

- Widespread planting of the same cultivar, like creating any mono-culture, is asking for trouble. This is especially true if the cultivar has not been tested for compatibility with your climate over a long period of time that includes the entire spectrum of climatic extremes. Within a community and sometimes even on a block — diversify your plantings!
- Graft incompatibility is an insidious problem that is difficult to detect. It is most common in red maples but affects some other species as well. Symptoms after planting include unexplainable decline or a sudden, smooth break of the trunk. Research, especially at the U.S. National Arboretum, has discovered the chemical causes for incompatibility. Scientists at the arboretum can offer ways to prevent this malady in some cultivars, including the use of rooting instead of grafting when this is physiologically possible. This is worth discussing with a nursery professional before making a purchase.
- If records are not kept and a cultivar needs to be replaced in a situation where uniformity is important (such as in a formal landscape around a government building), it may be impossible to match trees. A tree inventory with a record of nursery sources can easily prevent this.
- Unless carefully worded, low-bid purchases of planting stock can work counter to quality and long-term savings. To avoid dealing with a “middle man” or obtaining trees of unknown quality, include bid clauses that require: (1) that only growers are eligible, and (2) that the buyer has the right to inspect the nursery stock before it is dug. Also, specify the geographic area from which the seed source of scion material must come.

Cultivars for Every Situation



When toughness is needed on dry, harsh planting sites, 'Prairie Pride' hackberry may be just the right tree. This cultivar was introduced by Bill Wandell and received plant patent 3771 in 1975.



Hundreds of cultivars have been developed solely for the beauty they provide in the landscape. This weeping cherry, *Prunus subhirtella* 'Pendula', is a good example.

FOR MORE INFORMATION ...

There is an abundance of information about cultivars in books, booklets, and online. For more sources, please visit arborday.org/bulletins.

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