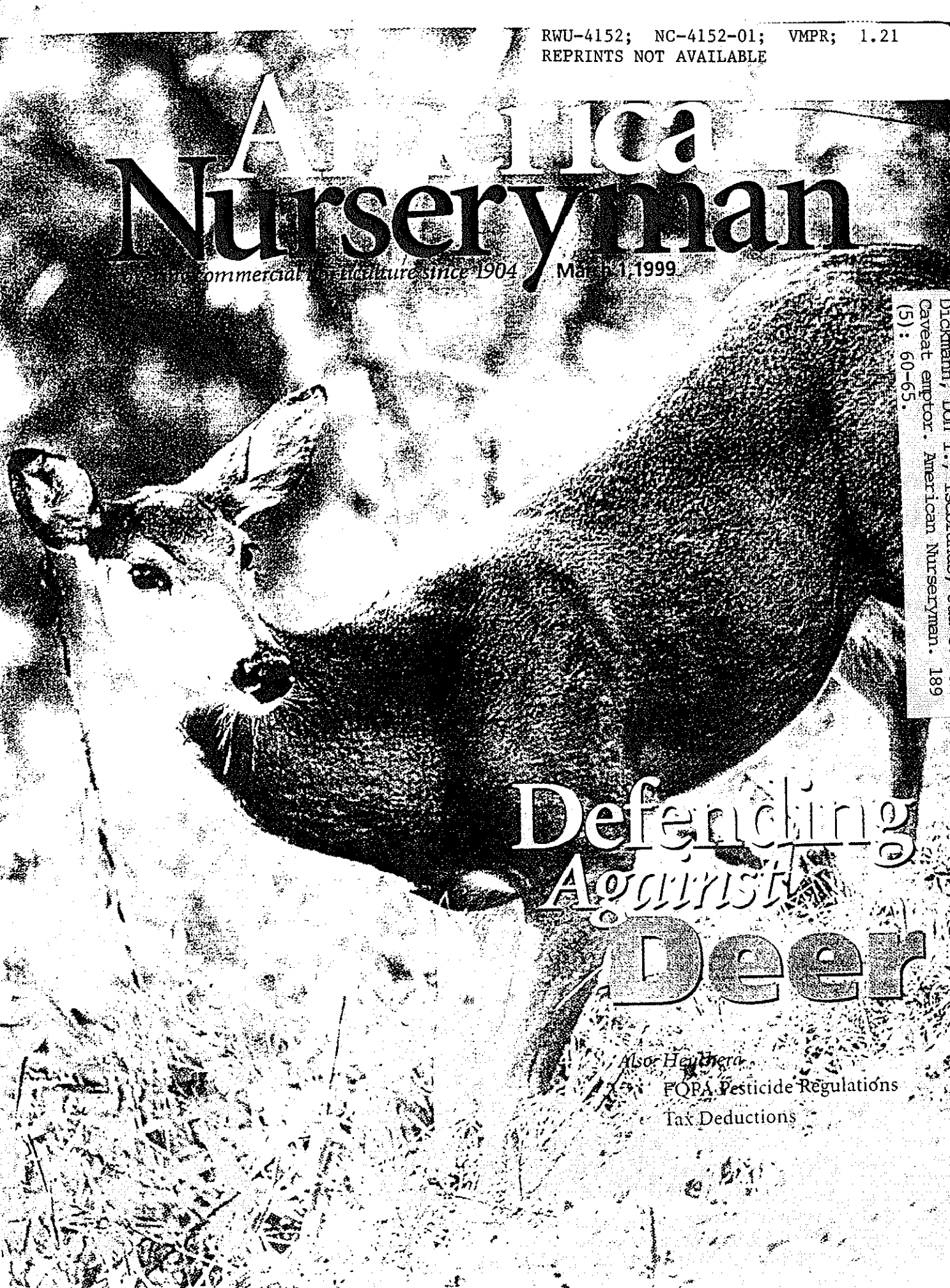
Nursery Management
Commercial Horticulture since 1904
March 1, 1999



Defending Against Deer

Also Inside:
- FQPA Pesticide Regulations
- Tax Deductions

American Nurseryman

Contents

Volume 189, Issue 5 March 1, 1999

30

On the Cover

Hungry deer are a menace to many nursery professionals, damaging ornamentals through their feeding habits. Turn to page 24 to find out what tactics some professionals are trying to control this pest.

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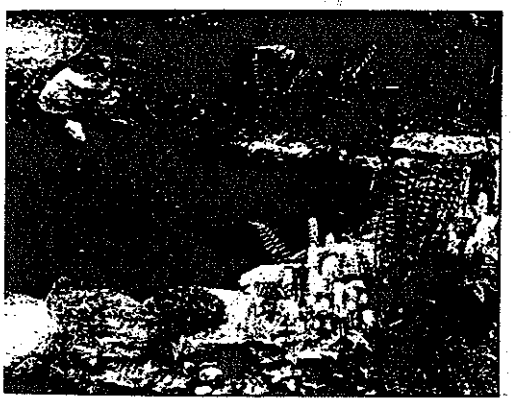


44

Features

52

Departments

In Every Issue

Caveat Emptor

NURSERY PROFESSIONALS SHOULD USE ONLY THOSE POPLAR CLONES THAT HAVE PROVED TO BE HARDY AND PEST- AND DISEASE-RESISTANT.

Text and photos by
DON I. DICKMANN
AND JUD G. ISEBRANDS

Jim knew about growing plants. We could tell that the minute we saw the 2-acre plantation of hybrid poplars he established in back of his house in rural mid-Michigan. The soil had been carefully prepared, the poplar cuttings were planted in neat rows and there were few weeds. The poplars, some of them more than 10 feet tall, were growing like only poplars can — fast. His plantation was a textbook example of how to plant trees. On closer inspection, however, we could see signs of trouble. Halfway through the second growing season, the main stems of some of the trees were showing discolored, sunken patches of dying bark — cankers. We knew it would only get worse.

Fungal pathogens are the bane of poplar culture and readily infect clonal cultivars not inherently resistant to them. In Jim's case, the culprit was *Septoria musiva*, an aggressive fungal pathogen common throughout the Northeast and Midwest, as well as in adjacent areas in Canada. Balsam poplars (section Tacamahaca of the genus *Populus*) are especially susceptible to *Septoria musiva* in these regions. The clone Jim planted was a hybrid between two Tacamahaca species — Japanese poplar (*Populus maximowiczii*) and Western black cottonwood (*P. trichocarpa*) — known by cultivar names 'Androscoggin' or 'NE-41'. He purchased the cuttings from a mail-order nursery that sold hybrid poplar planting stock throughout the country. Many of the nursery's clones had not been adequately tested outside its geographic area. Later tests showed that many of the nursery's clones were very prone to *Septoria musiva* infection in the Midwest.

This carefully tended screen planting of hybrid poplars was doomed because the owner unknowingly planted a commercial cultivar susceptible to *Septoria musiva*.

Jim wanted to know what he could do. We were not encouraging. There is no effective therapy for cankered trees. His trees soon would begin to die, or the weakened stems would break off in the wind. All he could do was cut out the worst trees, hoping the remaining ones would hold up for a while longer. Even so, the trunks of many of the trees still living would become swollen and distorted by the fungus.

Rust caused by *Melampsora medusae* can cause almost complete defoliation of susceptible cultivars in late summer.

Some poplar cultivars, such as the fast-growing 'NM-6' hybrid, have shown a tendency to break in strong winds.

Not a pretty sight for someone who had invested a lot of time, money and effort in establishing this plantation. We advised him to only plant clones that were proved — based on long-term field testing in Michigan — to be resistant to fungal infection. After giving him our recommendations of resistant clones, we offered him our condolences and left him with his sick trees.

We have seen this true story repeated over and over again here in the Midwest. The problem is derived from three of the trademark characteristics of poplars, especially hybrids. First, poplars grow faster than any other tree hardy in temperate climates. Second, with the exception of the related aspens, members of the genus *Populus* can be easily propagated using dormant hardwood stem cuttings. And third, poplars attract pests like a magnet. In addition to stem cankers caused by *Septoria musiva*, leaf rust caused by the fungus *Melampsora medusae* can defoliate susceptible clones by midsummer. Several other canker-causing diseases, leaf spots and tip blights can be troublesome. Certain clones also are attacked by insects, including defoliators, aphids, gall-makers, and twig or stem borers.

These characteristics — rapid growth and ease of propagation — are both a blessing and a curse. The blessing is obvious: easy establishment and large trees in a hurry. The curse is that any poplar clone that superficially looks good and grows rapidly, regardless of its hidden foibles, can be mass propagated and sold to trusting and unsuspecting buyers. There are millions of cuttings of pest-susceptible "junk" clones available today that should be burned or otherwise disposed of. If ever the warning *caveat emptor* — let the buyer beware — applied, it's when buying poplar planting stock. This warning stands whether you are a landscaper planting a few trees or a windbreak, or a nursery establishing propagation beds for cutting production.

Often splashy advertising hype, aimed principally at small, private land owners, accompanies the marketing of poplar planting stock. Beginning in late winter, the Sunday supplements to newspapers are a good place to find these advertisements. Please don't be fooled by the inflated claims and miraculous testimonials imbedded in them; they are often pure snake oil. The more outlandish the ad is, the more likely that the material being marketed is junk. These marketers are either intentionally scamming innocent buyers or they are unaware of the problems that plague the clones they are selling. The solution to this problem is simple: Buy poplar cuttings only from an established, reputable nursery, preferably one near your planting location. Insist that it supplies only cuttings of clones proved to be hardy and resistant to the diseases and insects prevalent in your

This *Populus maximowiczii* hybrid clone will soon be dead due to multiple cankers caused by *Septoria musiva*.

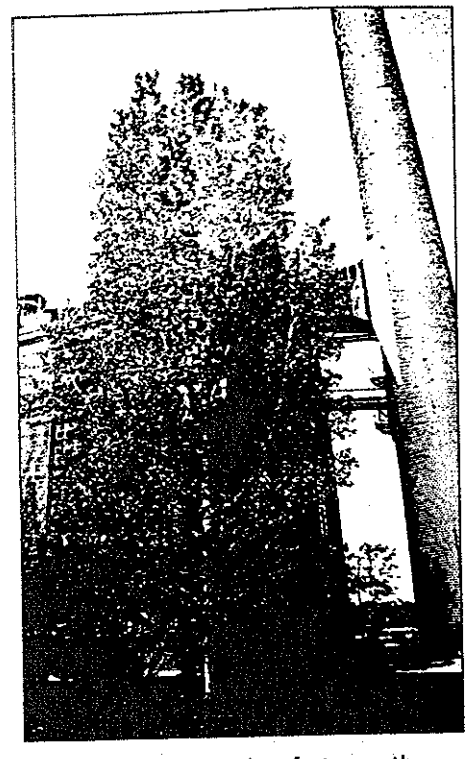
area. A responsible nursery should willingly comply.

If you own a nursery, stock only proven poplar clones. Your reputation depends on it. These clones vary from one area of the country to the next. What is good in Michigan may not be good in West Virginia or California. A large selection of clones is required if you market nationally. In the same way that perennials are targeted for certain hardiness zones, individual poplar clones must be marketed only in regions where they have been proved successful. Forestry or horticulture departments at local universities, cooperative extension offices, USDA Forest Service research laboratories or state natural resource agencies should be able to supply the necessary information on clones suitable for use in a particular area. But any recommendation must be based on long-term field testing. Make sure you do your homework.

Currently, tests are being conducted in Michigan, Wisconsin, Minnesota and Iowa by the North Central *Populus* Research Consortium. The consortium includes professionals from state universities, the USDA Forest Service and the US Department of Energy. This cooperative effort provides an example of how proof of clonal viability can be gathered. The consortium's objective is to identify promising new poplar clones for the North Central region. Although only a few proven clones are now available, interest in planting poplars in the region is on the upswing, as it is throughout North America. So the need for new clones is critical.

We began in 1995 with a planting of more than 60 clones selected by poplar geneticists at Iowa State University in Ames, the University of Minnesota in St. Paul and the USDA-Forest Service North Central Research Station in Rhinelander, WI. The clones, which included hybrids and native or Eastern cottonwood (*Populus deltoides*), were established in replicated two-tree plots at sites in the four states. A similar planting of about 90 clones followed in 1997.

Growth of these two plantings is measured yearly. Trees are being evaluated for disease and insect incidence, form, as well as breakage from wind, ice or snow. After five to 10 years from the time of planting, a small number of the "best" all-around clones from these plantings will be selected, and cuttings of them will be replanted in larger plots and grown for at least another 10 years. This is a long process, but absolutely necessary to find the most reliable material for widespread release.



The ease of propagation, fast growth and pleasing form of poplars make them a good choice for certain landscape or screen plantings.

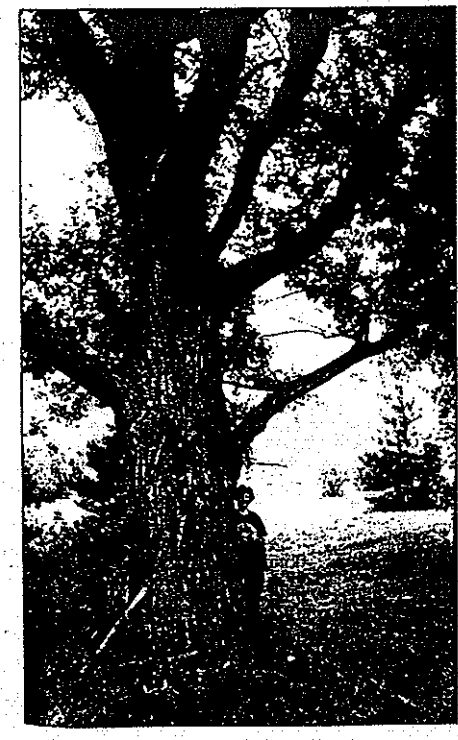
The case of clone 'NM-6' illustrates the need for long-term results. This clone — a hybrid of the European *Populus nigra* and *P. maximowiczii* — has shown impressive early growth and good canker resistance in initial test plantings. Thus, many people have begun to use it. But it's very easy to be taken in by the spectacular early performance of hybrid poplar clones. In fact, the growth of 'NM-6' begins to slow after four or five years. Like the tortoise and the hare story, other clones that start more slowly than 'NM-6' eventually exceed it in size. We have also discovered another important trait of this clone. Severe thunderstorms packing high winds swept through the Great Lakes states in spring 1998, causing widespread branch breakage and blowdown of 'NM-6' trees. Other clones resisted the wind better. As a result, we are now less enthusiastic about recommending 'NM-6'.

A *Populus* × *euramericana* clone provides a contrast to 'NM-6'. Known by many names — 'Eugenei', 'Carolina', 'Imperial Carolina', 'Norway', 'DN-34' or 'DN-5326' — this clone has stood the test of time. Although it does not grow as fast as some other poplar clones, and it is not absolutely disease-resistant, this attractive tree has very acceptable all-around characteristics. With proper care and in fertile soil, it will grow rapidly for

20 years or more. Moreover, because it is a male clone, this plant does not shed cotton. Therefore, it has been planted throughout the North Central region for decades and is one of the clones we most commonly recommend. But 'Eugenei' cannot and should not be planted everywhere. New clones are needed to complement it. In fact, we think some of the new clones now being tested will easily outperform it.

The need for testing will continue as poplar culture for landscape and other uses becomes more widespread. New hybrids and clones of pure species are continually being created and selected by nurseries, university and government laboratories, genetics cooperatives and forest industries. Many of these new clones are being developed using traditional breeding and selection protocols, but new technologies are also beginning to be employed. Poplar clones have been genetically engineered to be resistant to certain herbicides, for instance, although these clones have not yet been released to the public. Natural barriers to hybridization — for example, aspens do not cross with cottonwoods or balsam poplars — may soon be broken down using advanced genetic technology. Regardless of the exciting technology that produced them, these new clones also will require rigorous, long-term testing. This caveat is especially true of human-made hybrids, which represent

If planted in a location to which it is adapted, a disease-resistant clone can live for many years.



unique genetic combinations that are often unstable and short-lived. These clones simply haven't been subjected to the millions of years of natural selection that eliminate the unfit.

Tree geneticists and breeders, as well as nursery professionals, should give more attention to selecting genotypes of naturally occurring species, rather than just the flashy but often unstable hybrids. Eastern cottonwood, for example, has been neglected in our region, and we have insisted that it be included in the recent consortium tests. Several of the cottonwood clones in these tests — noncotton-producing males — are performing better than most of the hybrids. Many aspen clones, such as those of *Populus grandidentata* (large-toothed aspen) and *P. tremuloides* (quaking aspen), also show superior characteristics. If barriers to efficient clonal propagation of aspens can be overcome, selected clones would readily find a commercial niche. Not only can proven clones of natural species eventually be released for commercial distribution, but they would represent a more stable basis for genetic engineering for pest resistance or other improved traits.

OFTEN SPLASHY ADVERTISING HYPE, AIMED PRINCIPALLY AT SMALL, PRIVATE LAND OWNERS, ACCOMPANIES THE MARKETING OF POPLAR PLANTING STOCK.

We've learned one more lesson: Great care should be taken to identify a particular poplar clone correctly and then maintain that identity through subsequent propagation. Unfortunately, clonal identifications can easily be mixed up, so growers must be diligent. In addition, some growers have an uncontrollable urge to rename clones. Thus, 'Eugenei' became 'Norway', 'Norway' became 'Carolina', 'Carolina' became 'Imperial Carolina' and so on. But they're all the same clone. This practice has no justification; it only leads to great confusion or worse — failed plantings when misidentified clones are used. To compound the problem, genetically distinct poplar clones often show subtle differences in traits such as the leaf and stem color, bark structure and crown architecture. Stem cuttings of different clones are especially difficult to tell

apart. As a result, a supposedly pure poplar plantation or nursery bed often contains a few "ringer" clones. If a system of registration and certification of poplar clones were in place in the US as it is in Europe, this problem would be minimized. But we don't see such a system forthcoming in the near future.

New genetic technologies may provide a partial solution to establishing the identity of unknown or misidentified clones. DNA fingerprinting is becoming commonplace, and it works as well in plants as it does in humans. Eventually, a clearinghouse could be established where DNA fingerprints of a wide range of poplar clones could be archived, including those released for commercial use. Unknown samples could be sent to the clearinghouse for testing and identification. Clones not recognized as proven performers could then be easily targeted and discarded.

The future of poplar culture is bright. In addition to conventional applications for landscaping, windbreaks, bioenergy and fiber production, poplars are showing their versatility in other areas. They can be used to clean up polluted industrial sites because they absorb the heavy metals arsenic, cadmium, chromium, copper, lead, mercury and zinc from the soil and sequester these contaminants in their tissues. Certain toxic organic pollutants, such as trichloroethylene, that leach into the soil also can be taken up by poplars and metabolized to harmless compounds. Poplar plantations absorb large quantities of carbon dioxide from the atmosphere and store the photosynthetically transformed carbon, thereby mitigating global climate changes. Poplars and willows have also been planted along streams and drainage ditches to act as living filters of eroded soil and chemical runoff from agricultural fields. These riparian buffers also improve wildlife habitat.

Whatever their use, only reliable poplar clones with proven performance in a particular area should be selected for planting. Otherwise, poorly adapted or junk clones can turn the fabulous potential of these unique trees into a nightmare. That's what Jim discovered.

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