The Firs

by Dr. Bert Cregg

As a native of the Pacific Northwest, I have always had a soft spot in my heart for firs. From high school summers shearing deep green grand firs (*Abies grandis*) on Christmas tree plantations to seeing the spire-like crowns of subalpine fir (*Abies lasiocarpa*) on day trips to Mt. Rainier, firs were an ever-present symbol of my Northwest upbringing. The true firs (genus *Abies*) include a remarkable variety of trees that are important to the nursery, landscape, and Christmas tree industries of Michigan.

The genus includes over 40 species distributed throughout the temperature regions of the Northern Hemisphere. Firs are single-needled members of the *pinaceae* family and are distinguished by the fact that their cones are borne upright and disintegrate rather than drop off the tree intact. Firs are very attractive as ornamentals and Christmas trees because of their upright and symmetrical growth habit. The popularity of firs, particularly Fraser fir (*Abies fraseri*), as Christmas trees has grown steadily over the recent past. While Scots pine was once the mainstay of the Michigan Christmas tree industry, more and more growers are switching production to Fraser fir. The use of firs for landscaping, however, continues to lag behind "tried and true" conifers such as pines and spruces. The biggest reason firs trail other landscape conifers is that many fir species are fairly exacting in their site requirements. As a general rule, firs prefer acidic soil conditions, usually the lower the pH, the better. In native stands, firs grow on soils with pHs in the 3-4 range. While most people think of pH as a limiting factor in planting firs, in reality, soil drainage is often a bigger limiting factor. We can adjust soil pH by applying sulfur or fertilizing with ammonium sulfate to make a site more suitable for firs, whereas soil drainage is difficult to change across a landscape. Nevertheless, there are several reasons to expect the use of firs to increase in the future:

1. Blue Spruce Burnout

Since I've started this column people have asked me, "Why do you hate blue spruce so much?" For the record, I don't hate blue spruce (or Norway spruce or Scots pine or Austrian pine or white pine). It's like the old saying, "There are no bad dogs, just bad owners". It's not the fault of blue spruce that it's been over-planted. Blue spruce is easy to grow both in the nursery and the landscape; it tolerates poor site conditions and even road salt. But, as we're learning again with Emerald Ash Borer, over-planting a single species or even a handful of species is a recipe for disaster. Diversity is strength.

2. Introduction of New Species

Efforts are underway here at MSU and elsewhere in the United States to evaluate exotic species of firs that may be adapted for use as Christmas trees and ornamentals. About ten years ago Dr. Mel Koelling, MSU Forestry Department, and MSU Statewide Christmas tree Extension Agent Jill O'Donnell began a program to examine exotic firs for Michigan. To date, they have planted over 40 species and hybrids of firs in a demonstration planting at the Kellogg Experimental Forest near Augusta, Michigan. The principle goal of the program was to evaluate the new fir species for Christmas trees. However, with support from MSU Project GREEEN, we have transplanted over 200 of the trees to MSU Horticulture Research Stations across the state and are expanding the evaluation to include traits that are critical in landscapes such as response to soil pH and drought.

3. Introduction of Hybrids

One of the interesting features of firs is that many species hybridize readily. It may be possible through hybridization to combine desirable ornamental traits from one species (say, needle color or form) with stress adaptations from another species such as drought tolerance. While we usually expect hybrids to be intermediate between their parent species, certain crosses may result in "hybrid vigor", a type of synergy in which the progeny are superior to either parent. Early results from our work with the exotic firs from Kellogg Forest suggest that hybrids of Korean fir such as Korean x Veich and Korean x Balsam are well adapted for Michigan's climate. At the 2003 Exotic conifer conference in Clinton, Iowa, hybrid firs were one of the hottest topics and many conifer breeders are experimenting with new crosses. So look for more hybrid firs to become available in the future.

4. Introduction of Inter-specific Grafts

Another way to combine traits from one species with another is by grafting a scion (top) of one species onto the rootstock of another. This is a really exciting development in efforts to promote and expand the use of firs. Scientists at North Carolina State University are experimenting with inter-specific grafts to overcome problems associated with phytophthora root

Chub Notes

Justin "Chub" Harper is widely known as one of the leading experts on garden conifers in the United States. The Harper Collection of Dwarf and Rare Conifers at MSU's Hidden Lake Gardens is nationally recognized. Each Conifer Corner includes Chub's notes on his favorite (and not so favorite) conifers.

rot in Fraser fir by grafting Fraser fir (which is highly susceptible to *phytophthora*) onto species such as Momi fir that are resistant to root rot. At the 2003 International Christmas Research and Extension conference, the field tour visited a test planting of grafted and ungrafted seedlings of Fraser fir. Mortality of ungrafted seedlings was nearly 100 percent whereas seedlings that were grafted onto resistant rootstocks had virtually no mortality. Inter-specific grafting also offers the potential to graft onto rootstocks with tolerance to adverse soil conditions such as poor drainage or high soil pH.

Noteworthy Landscaping Firs

There are a number of firs that make excellent landscape trees and this list provides just a sampling. As a general rule, true firs are more demanding in their site requirements then most other conifers. Firs don't like wet feet so avoid sites with poor drainage. If your soil pH is above 6.5 you may need to add elemental sulfur or fertilize to reduce the soil pH.

Concolor fir (*Abies concolor*)

Concolor fir is native to mountainous areas of the West. It's one of the most popular firs for landscaping because it will tolerate higher pH levels than most other firs. Chub Harper notes: "Concolor fir is just about everyone's favorite because it holds up to heat and cold."

'Candicans' - Upright grower with long silver-blue needles. Zone 4

'Swifts Silver' - A superior selection, exceptional silvery colored needles, uniform growth, well suited for ornamental uses and Christmas tree production

John Fertig

***Abies concolor* 'Candicans'**

'Gables Weeping' - An irregular mounding or weeping form with blue-green needles. Zone 3

Korean fir (*Abies koreana*)

Korean fir is well adapted to landscapes in Michigan. There are several excellent specimens at the Harper Collection at Hidden Lake Gardens and the species and hybrids have done well at the demonstration planting at Kellogg Forest. Several outstanding cultivars are available in the trade. Like Fraser fir, Korean fir is a precocious cone producer.

'Aurea' - A golden-yellow form of Korean fir that is a broad globe when young and later develops a leader and grows in a broad upright form. The short needles are bright yellow to golden in color becoming dull by winter. Chub notes: "This is a real show-stopper, especially when it cones." Zone 4

'Blue Cones' - As the name implies, this cultivar is noteworthy for its dramatic blue cones in the spring. Zone 5

'Silberlocke' - The needles on this cultivar are recurved (turned upward) revealing the silver underside. The result is a striking silver appearance. Chub notes: "A dramatic and outstanding tree, this is one everyone lusts after. The only downside is the silver characteristic of the needles tend to fade with age." Zone 4

Subalpine fir (*Abies lasiocarpa*)

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***Abies koreana* 'Silberlocke'**

Subalpine fir is another example of a high elevation western species that does well in our Midwest climate. Our research has shown that it is relatively tolerant of soil pH compared to other firs. Moisture availability and soil drainage are probably the principle limiting factors for this interesting species.

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***Abies lasiocarpa* 'Green Globe'**

'Green Globe' - A dwarf, globose form with green needles, Chub notes: "This is a reliable plant I rate among the top five for dwarf conifers." Zone 5

Corkbark fir (*Abies lasiocarpa* var. *arizonica*)

Corkbark fir is the only recognized natural geographic variety of *A. lasiocarpa*. The common name derives


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Abies lasiocarpa* var. *arizonica

from its peculiar, whitish, corky bark. The variety is restricted to the Rocky Mountains of southern Colorado and the Southwest and includes several cultivated forms. Corkbark fir tends to break bud early and may be subject to late frost damage.

'Compacta'

This is an outstanding ornamental conifer and one that appears on many nursery and collectors' "Top Ten" lists. A dense, upright to oval crown with striking blue needles, American Conifer Society classifies its growth rate at intermediate (6-15 feet at 10 years of age) but expect growth to be on the slower end of the range.

Nordmann fir (*Abies nordmanniana*)

Nordmann fir is also called Caucasian fir in reference to its native range in the Caucus mountains of Northern Turkey, Georgia and


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Abies nordmanniana

Abkhazia. The species has dark green lustrous needles and is a fast grower. There are several specimens over 80 feet tall at the State Hospital at Traverse City, Michigan. Zone 5

Douglas-fir (*Psuedotsuga menziesii*)

Interior forms of Douglas-fir are well adapted to Michigan and can grow to be large trees. Douglas-fir is also widely planted as a Christmas tree in Michigan. Seed sources from the Lincoln National Forest in New Mexico and the San Isabel National Forest in Colorado are preferred for their drought and heat tolerance.

'Graceful Grace'

Chub notes: "This is one that really gets attention. A contorted weeping form - not for everybody." Zone 4

'Fletcheri'

A blue-green dwarf form less than 3 feet at ten years of age), compact irregular habit, another one that appears on many "Top Ten" lists. Zone 4

'Wycoff's Big Blue'

Large, upright-growing Douglas-fir, striking light blue foliage that is very distinctive, Chub notes: "At first glance you'll swear this is a 'Hoopsi' blue spruce." Zone 5


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Near Right:
Pseudotsuga menziesii

Far Right:
Fir cones

Douglas-fir: *When A Fir Is Not A Fir*

Douglas-fir is a classic case of how common names can often lead to confusion. Douglas-fir is member of a separate genus, *Psuedotsuga*, which actually translates to "false hemlock". To help distinguish it from other firs the common name is hyphenated as Douglas-fir. Other common names such as Oregon pine only add to the species' identity crisis.

While at first glance Douglas-fir might be confused with a true fir or a spruce, there are several key characteristics that make it one of the easiest conifers to identify. Douglas-fir has persistent cones that have distinctive pitchfork bracts. If cones are not present, Douglas-fir can be identified by its distinguishing pointy buds.

There are two species of *Pseudotsuga* in North America: *Pseudotsuga menziesii* (Douglas-fir) and *Pseudotsuga macrocarpa* (Big cone Douglas-fir), which has a relatively small native range in southern California.

Douglas-fir is a versatile conifer that is well-adapted to Michigan. It grows well on many sites and is useful as both a landscape tree and as a Christmas tree. It is native throughout western North America and the coastal form (var. *menziesii*) is one of the most important commercial forest tree species in the world and the largest member of the *Pinaceae* family. Coastal Douglas-fir have been measured at 330 feet tall and 45 feet in circumference. In the Michigan and the upper Midwest we are limited to the interior form (var. *scopulorum*), which is slower growing but more cold and drought tolerant than the coastal variety.