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concolor fir
& christmas tree check off

Conifer Species Profile: *Abies concolor* Concolor fir, white fir

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This edition of our Conifer Species Profiles features one of the most interesting and versatile conifers grown for Christmas trees in the Great Lakes region, *Abies concolor*.



Abies concolor 'Select' features upright, blue needles.



Needle color and needle retention vary with seed source of concolor fir. Left to right: San Juan, Rio Grande, Lincoln, Apache. Photo courtesy Dr. Rick Bates, PSU.



Form, color, scent, needle retention. Concolor fir has all the traits of a great Christmas tree. Photo courtesy Dr. Rick Bates, PSU.

In the eastern U.S. *Abies concolor* is commonly referred to as concolor fir, while in the West it is usually called white fir. Regardless of what you call it, *Abies concolor* is an outstanding tree that offers a change of pace as a Christmas tree and makes a great landscape specimen as well.

Native range and environment

Abies concolor is native to the Sierra Nevada Mountains of southern Oregon and California and is widely distributed in the southern Rocky Mountains. Variation between the two regions of *Abies concolor* is sufficient that two varieties are commonly recognized; var. *concolor*, Rocky Mountain white fir, and var. *lowiana*, California white fir. The Rocky Mountain form is adapted to high elevations (7,000-9,000 feet), short growing seasons and low rainfall. California white fir, in contrast, is adapted to relatively warmer conditions and higher rainfall. Because of this, var. *lowiana* is not suited for the Lake States. Michigan State University Forest Geneticist Dr. Jonathan Wright attempted to grow seedlings of California white fir in early genetics trials and found that all were killed back to snow level in Michigan winters. Rocky Mountain white fir occurs in widely scat-

tered populations throughout the southern Rockies. Because of geographic isolation among populations and diverse soils and climate, *Abies concolor* shows a high degree of genetic variation in growth rate and form (see discussion below). Within the genus *Abies*, concolor fir is classified in the section *Grandis* and grand fir (*A. grandis*) is the very closely related. *Abies concolor* and *A. grandis* naturally hybridize forming an introgression zone where the range of the two species overlap.

Use as a Christmas tree

Concolor fir represents a small but increasing segment of the Christmas tree market. Among true firs (*Abies spp.*) in Michigan, concolor fir ranks a distant second to Fraser fir (*Abies fraseri*) but the total acreage in concolor production nearly doubled from 1994 to 2005 to 1,100 acres. The appeal of concolor fir as a Christmas tree is unmistakable. Concolor fir has a stately symmetrical growth habit when young. Needles are typically blue-green and, in some cases, can be a dramatic powder blue. Needles of concolor fir are longer than most other firs commonly grown for Christmas trees, giving trees a coarser texture than most other firs. Branches are still and hold

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ornaments well. Concolor needles have a pleasant scent that is usually described as citrus- or orange-like. Needle retention is excellent, though it varies by seed source (see discussion below). Because of its unique appearance, consumer attitudes toward concolor fir may be best described as 'love it or leave it'. Christmas tree grower and nurseryman Jerry Peterson notes, "Some chose-and-cut customers go straight for the concolors and others wouldn't take one if you gave it to them." Once consumers choose concolor it often becomes a favorite and the average wholesale price of concolor fir (\$19/tree in 2005) is second only to Fraser fir. For growers, one of the principle liabilities of concolor is early budbreak resulting in

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Range map of *Abies concolor*. Concolor fir has a wide but disjunct distribution in the Southwest, resulting in a high level of population variation.



Concolor fir is among the first species to break bud and therefore susceptible to late frosts.

Concolor fir's combination of adaptability and aesthetic appeal make it the most widely used true fir in the landscape trade in the eastern United States. Concolor fir is rated as hardy to zone 3 or zone 4 so it can survive winter throughout the Great Lakes region.

late frost injury. Concolor fir is a good grower and growth rates are comparable to Fraser fir. Culturing concolor can take a little extra effort compared to Fraser, however. According to grower Dan Wamhoff, "Concolor can produce a good Christmas tree in a reasonable time, but tops can have some erratic growth and require some top-work to maintain a good leader." While concolor fir cannot be considered 'pest-free' it generally has fewer pest problems than many other Christmas tree species. Like most firs, Concolor is susceptible to balsam twig aphid and spider mites.

Genetics

As noted earlier, only the Rocky Mountain form of Concolor fir, var. *con-*

color, is suited for planting in the Great Lakes region. Seed sources within the Rocky Mountains also show considerable variation. Provenance testing and grower experience indicate Santa Fe, Cibola, San Juan, and Rio Grande seed sources rate the highest in terms of overall growth, color and form. In a provenance test in Idaho the seed sources were ranked

- Rio Grande (NM)
- Santa Fe (NM)
- Cibola (NM)
- Kiabab (AZ)
- Lincoln (NM)

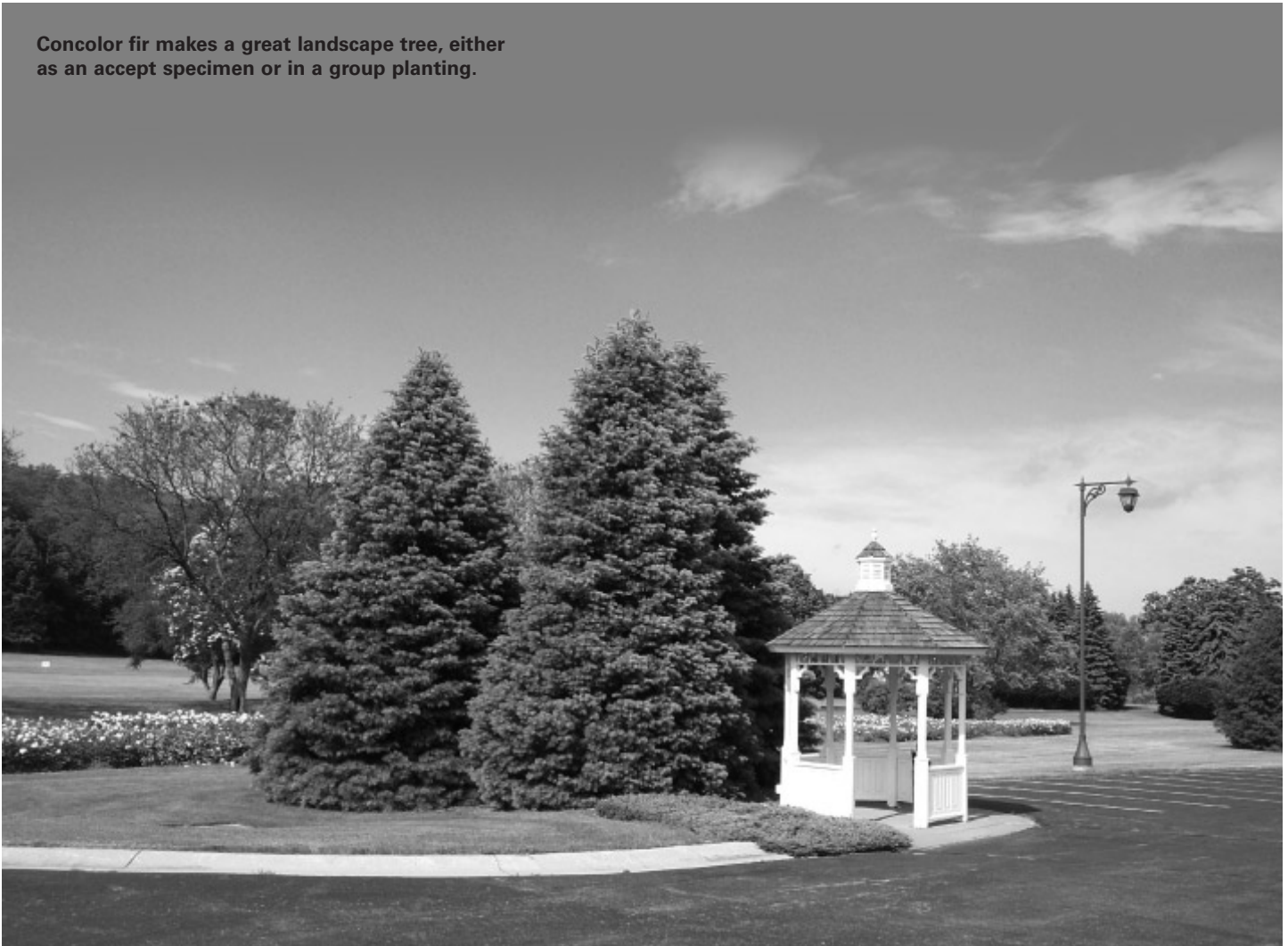
Kaibab ranked below the first three due to slow growth rate. Lincoln was the fastest grower but experienced problems with twisted and/or multiple leaders. Needle retention also varies among seed

sources. In a comparison of needle retention among concolor fir provenances at Penn State; Santa Fe and Rio Grande had the best needle retention, Apache had the poorest, and Lincoln was intermediate. Overall quality ratings of the seed sources during a 35-day display followed the same trend.

Landscape use

Concolor fir's combination of adaptability and aesthetic appeal make it the most widely used true fir in the landscape trade in the eastern United States. Concolor fir is rated as hardy to zone 3 or zone 4 so it can survive winter throughout the Great Lakes region. As noted earlier, concolor fir will tolerate poorer drainage and more alkaline soil pH conditions than most other firs. It is important to keep in mind, however, that these tolerances are relative to other firs; concolor will not do well in heavy clay or in standing water. Success of transplanting landscape-sized concolor firs is usually high to good. Depending on the nursery site trees may sink some deep large roots, which makes lifting a challenge and increases loss of roots in transplanting. Standard techniques to

Concolor fir makes a great landscape tree, either as an accept specimen or in a group planting.



increase the proportion of roots in the harvested root-ball (root pruning, drip irrigation, fertilizing only within the tree's drip-line) should ease lifting and improve transplant success. The American Conifer Society recognizes over 40 landscape cultivars of *Abies concolor*, many of which are noteworthy for their striking blue color. Below are some of the more widely planted or interesting landscape cultivars of *Abies concolor*.

'Blue cloak' Slow growing form of concolor fir with striking blue needles and weeping growth habit.

'Candicans' One of the bluest forms of concolor fir. Upright plant, needles are big and powder blue.



Seed sources of concolor fir vary widely in their growth rate. All the trees in this Penn State provenance test are the same age. Photo courtesy Dr. Rick Bates, PSU.

'Candicans' is an outstanding cultivar of concolor, noted for its powder blue needles.



'Conica' is an upright narrow form of *A. concolor*. Slower growing than the straight species so it is suited for smaller spaces.

'Gable's weeping' This plant doesn't weep as much as weeping forms of other conifers like white pine or larch. Stanley and Sons nursery catalog aptly describes the appearance as 'wind-swept.' Needle color tends toward green rather than blue.

'Compacta' A dwarf compact upright plant. Needles are large and blue. Plant will only be about 6 ft. in 10 years.

'Winter Gold' An upright conical tree growing about 6" per year. Needles are green to yellow-green, turning gold in the winter.

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***Abies concolor* 'Gable's weeping'** is noteworthy for its wind-swept appearance.

