Bald Cypress & Dawn Redwood:

Deciduous Conifers and Newcomers to the Urban Landscape

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Dawn redwood bark and form -- John Ruter, University of Georgia, Bugwood.org

Many Minnesotans are already familiar with one type of deciduous conifer: our native tamarack (*Larix laricina*). Those deciduous conifers are fairly unique and relatively uncommon. They have both needle-like leaves and seeds contained in some sort of cone, but also drop their needles annually with the changing seasons. Tamaracks are often found growing in bogs or other acidic, lowland or wet sites, as well as many upland sites, and have clustered tufts of soft needles that turn yellow and are shed annually.

Though, aside from our native, a couple other deciduous conifers of the Cupressaceae family have begun to make an appearance in urban and garden landscapes over the last several decades: dawn redwood (*Metasequoia glyptostroboides*) and bald cypress (*Taxodium distichum*).

A couple of factors have made the introduction of these two species possible. Dawn redwood was thought to be extinct until the 1940s, but the discovery of some isolated pockets in China made the distribution of seeds and introduction of the tree possible worldwide. Bald cypress is native to much of the southeastern US, growing in a variety of sites including standing water. Historically, this tree would not have been able to survive the harshest winters this far north, but the warming Minnesota climate over the last several decades has allowed bald cypress to succeed in a variety of plantings. Both species are gaining interest because of their unique morphological features, appealing fall color, and promising tolerance of some tough urban conditions.

The Story of Dawn Redwood (*Metasequoia glyptostroboides*)

Thought to be extinct for several million years, dawn redwood is the sole member of the genus *Metasequoia*. Meaning like a sequoia, the genus was first described by Japanese paleobotanist Shigeru Miki

from fossil records in 1941. It is one of only three monotypic genus members of the subfamily Sequoioideae (now lying within Cupressaceae): *Sequoia*, *Sequoiadendron*, and *Metasequoia*. Fossil records now show that this species has been around for at least as long as 50 million years, existing almost entirely in morphological stasis since then.

In 1941, living stands of this tree were discovered by Chinese forestry professor T. Kan. He found a large deciduous tree known to locals as *shui-sa*, or water fir, but did not collect any samples as it had already shed its needles for the winter. Because of complications from WWII, it wasn't until 1946 that a paper describing the species was finally published by Professor Hsen Hsu Hu in collaboration with other Chinese colleagues. The following year, an expedition from Harvard University's Arnold Arboretum collected large quantities of the seeds and eventually distributed them to other universities and botanical gardens around the United States and the world.

Interestingly, Wilhelm Gunther, a German national working in China in the 1920s, seemingly collected *M. glyptostroboides* seeds during his time there and successfully germinated and planted two of them in the US in the early 1950s, both still growing well as recently as 2002. Those seeds survived both WWII and being shipped from China and around the US, and their collection would predate the discovery and description of the species in the 1940s.

Ecology of Bald Cypress

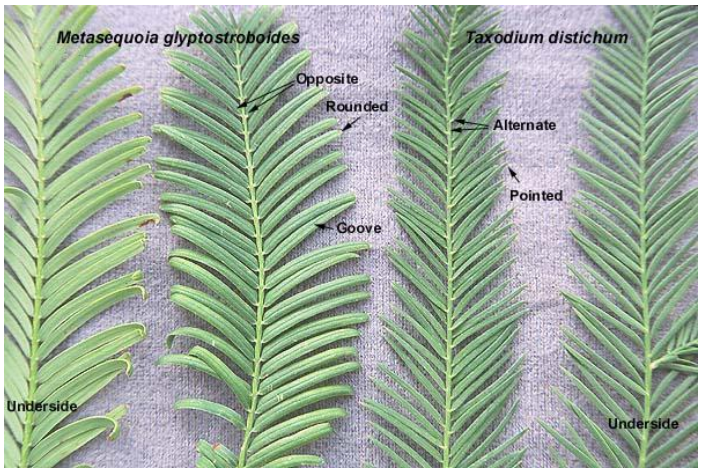
Bald cypress trunk and knees – Missouri Botanical Garden

In the southeast US, bald cypress are often found growing directly in water found in swamps and other wet areas, frequently covered in spanish moss. In cultivation, they will also happily grow on drier upland sites. Especially when growing in wet areas, the trees produce knobbly, above ground or above the waterline root structures called knees. Several hypotheses have been proposed since the mid-1800s about the purpose of these structures. The most common is that the knees provide necessary oxygen to frequently wet or submerged root systems. Others have said that, like buttressed tree bases provide mechanical support for a variety of tropical trees, so might the knees of bald cypress, especially for roots anchored in a loose substrate. Other ideas include nutrient acquisition or carbon storage, but ultimately research investigating all of these hypotheses has not supported any of them. One

possibility is that the knees evolved under environmental conditions that no longer exist, making their function lost to time. Though, this too is not certain.

Identification and Descriptions

Both dawn redwood and bald cypress are relatively closely related and similar in appearance. Both species feature soft, feathery needles splayed out mostly horizontally along branchlets, turning a beautiful bronze in the fall, and tall, often widely flaring boles with deep fissures or fluting in the lower parts of the tree. Though not identical, the two species have fibrous or peeling brown to red-brown bark.



Foliage comparison -- https://landscapeplants.oregonstate.edu/metasequoia-glyptostroboides-and-taxodium-distichum Thursday, 1 hr. Friday, 3 hr. Sat. 4 hr. Sun, 2.5 hr.

T. distichum's production of knees can help distinguish the two. Also, the needles of *M. glyptostroboides* are somewhat rounded and have opposite arrangement, while those of bald cypress are somewhat pointy and arranged alternately along the stem. Both are fast growing, large trees, though dawn redwood will grow a bit faster and has the potential to top 100' much more often than bald cypress.

Dawn redwood foliage -- Robert Vidéki, Doronicum Kft., Bugwood.org

Bald Cypress foliage -- UMN campus trees http://campustrees.umn.edu/bald-cypress

References and Additional Reading

History and ecology of dawn redwood

Gittlen, W. (1998). *Discovered alive: The story of the Chinese redwood* (1st ed.). Berkeley, Calif.: Pierside Publications.

Metasequoia After Fifty Years-- http://arnoldia.arboretum.harvard.edu/pdf/issues/189.pdf

Dawn redwood ID

https://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=a396

https://www.mortonarb.org/trees-plants/tree-plant-descriptions/dawn-redwood

Bald Cypress ID and ecology

https://www.mortonarb.org/trees-plants/tree-plant-descriptions/bald-cypress

http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=m510

Cypress Knees: An Enduring Enigma-- http://arnoldia.arboretum.harvard.edu/pdf/articles/2000-60-4-cypress-knees-an-enduring-enigma.pdf

About the Author: *Dan Petters*

Dan Petters is an undergraduate research assistant in the UFore lab and a senior in Urban and Community Forestry. He is passionate about caring for all things that photosynthesize and driven by a long standing love for being outside among growing things. In the coming years he's hoping to continue working with exciting trees and people.