Sciadopitys – A Beautiful Plant That May Fool You

I cannot recall how many times I have failed to understand the very basic parts of plant anatomy, even when it appeared so obvious! For example, I once thought Asters had petals typical of most flowering plants. I was wrong. With Dogwoods, I mistakenly thought the showy flowers had petals and I was only partially correct in thinking Magnolia flowers had petals. Yes, it no longer comes as a surprise when I am wrong. However, I was totally surprised to learn the beautiful, glossy 'foliage' of the Japanese Umbrella Pine, botanically known as *Sciadopitys verticillata* is not true foliage at all!

As you may have guessed, Umbrella Pine is also not a true pine. Rather, it is the sole member of the Sciadopityaceae or Umbrella Pine Family! It was originally placed within the Taxaceae or Yew Family, then shifted to the Cupressaceae or Cypress Family. It is now thought the Sciadopityaceae is a distant and much older relative to both of these families. Part of the difficulty in determining the tree's family heritage is from the significant age of the genus. Plants of the Sciadopityaceae date back between 230-250 million years to the Triassic Period. The genus initially diversified and developed numerous species that slowly spread over a broad range. As one might expect, the world appeared much different during the Triassic age, an age when the continents were connected into one land mass called Pangea. The number of different *Sciadopitys* species is thought to have peaked around 100 million years ago when the various species spread across what is now North America, Europe and Asia. Since then, the species have dwindled to one, which is currently found only in the clouded mountainous regions of central Japan, at elevations between 1,500-3,000 feet. The image at right is of a specimen at Smith College, planted around 1896.

The plant was first described and named as *Taxus verticillata* by the Swedish physician and naturalist Carl Peter Thunberg (1743-1828) in 1784. Thunberg visited Japan from August 1775 to November 1776, providing medicinal insights for the local community as well as studying the local flora and fauna. It was not until the publishing of his book *Flora Japonica* in 1784 that the plants he studied finally had written descriptions. In 1842 the genus was renamed *Sciadopitys* by the team of Phillip Franz von Siebold (1796-1866), a German physician and botanist, and Joseph Gerhard Zuccarini (1797-1848), a German professor of botany. Like Thunberg, Siebold frequently traveled and during 1823-1829 he too studied plants in Japan. Zuccarini worked extensively with Siebold to describe the many species sent back to Germany from abroad. The genus name is derived from the

Greek *Sciados* for shadow or umbrella and *Pitys* meaning Pine. The species name is from the Latin meaning whorled, referring to the arrangement of the green 'foliage' around the stems, as seen above right, which to me resembles the spokes of an umbrella.

Sciadopitys was first brought to the United States in 1861 by Dr. George Hall (1820-1899), a physician who subsequently became a plant and art trader. He introduced many garden worthy plants to the US, including the Japanese Yew (*Taxus cuspidata*). He also introduced less than garden worthy plants, such as Hall's Honeysuckle (*Lonicera japonica* var. *halliana*)! Hall gave the first plant of *Sciadopitys* to the historian Francis Parkman Jr. (1823-1893). According to an article written by Hall's grandson and published in Arnoldia in April 1923, the selection Parkman received was listed as a variegated form of the plant as well! The common name of Umbrella Pine appears rather obvious given the Greek roots of the genus. Evidently, it was not all that obvious and Parkman is credited with being the first to provide the common name!

Beautifully pyramidal in form in youth (as seen above left at Frelinghuysen Arboretum), it is the 'foliage' that actually takes center stage. In fact, the foliage is composed of not one, but two distinct types of 'leaves': the long glossy 'foliage' that appears in whirls of 20-30 around the younger portions of a branch and small scale-like structures found along the stem (both are seen in the image below right). It is these whirls of 'leaves' that resemble the spokes of an Umbrella that I failed to understand when first observing the plant. Most authorities now believe these 'leaves' to be photosynthetic stems called cladodes that serve the function of leaves. The pliable and flattened cladodes are 4-6" long and roughly 1/8" wide. Running the length of both the top and bottom is a prominent central groove, with the lower groove attractively colored silver from the concentration of stomata (as seen in part at right). Stomata regulate the exchange of atmospheric gases in and out of leaves and stems that in turn are necessary for photosynthesis and respiration. The tips of the cladodes have two small nibs located on either side of the central groove, giving the impression the structure is formed from two individual needle-like leaves, as was originally suspected. The whirls of cladodes persist for 3-4 years before being shed from the tree.

The cladodes have a plastic appearance and quality when touched that I initially found amazing and rather startling. In fact, although I was first introduced to the plant many decades ago, I still recall the surprise of these plastic-like

qualities as if it was yesterday! Far less noticeable are the small, scale-like remnants of the true leaves. They are tan in color and bear no resemblance to a leaf. They appear at the base of each cladode and sporadically along the current season's growth, as seen above at the tip of the arrow. Why the true leaves became reduced and secondary to the photosynthetic cladodes is only speculative, but it did allow the genus to thrive and diversify into several species for its first 150 million years of life on earth. Although the last 100 or so million years has seen the size of the genus slowly diminish to the one remaining species, it is fortunately a very beautiful species!

Typical to conifers, the plants are monoecious, whereby the individual male and female cones or strobili, as they are called botanically, are located on the same plant. They do not appear until the tree has matured to 20 or so years of age with the male cones appearing several years prior to their female counterparts. The pollen releasing male cones (pictured above) appear on the branch tips in the lower portions of the tree. They appear in dense clusters of 15-25 spherical structures that are rather attractive when viewed closely. The female cones (as seen at right) are located in the upper reaches of the plant, providing the heavier seeds a better opportunity to be blown as far from the parent plant as possible. After pollination, the female cones remain closed for 18-20 months to allow for seed maturation. Each cone consists of 15-40 fertile scales, with each scale yielding 5-9 seeds. The ¼" long seeds are oval and flattened (as seen at left) with a wing-like appendage along the edge, allowing the seed to be propelled further by the wind once released. Although the plant is far from invasive, it is not unusual to see an occasional seedling where several Umbrella Pines are located in close proximity. Once the seeds are shed, the cones disintegrate fairly quickly unless harvested for their ornamental appeal.

Despite its unique beauty, the plant remains rare in commerce due to its modest growth rate of 4-6” when young. This slow growth rate also makes the purchase price more costly than many gardeners wish to bear. Often promoted as a dwarf plant for rock gardens, it grows with more exuberance once it reaches 6’ tall and in the woodlands of Japan it can reach 100’ tall and live for over 600 years! In these Japanese forests, *Sciadopitys* is often found growing together with the False Cypress (*Chamaecyparis obtusa*). As the plant ages, the lower branches decline and reveal the attractive reddish-brown bark that peels off in long vertical strips (pictured above). Over time, the bark becomes thicker and develops a spongy texture, making it fun to touch and ideal for locating where it can be touched and appreciated.

As noted above, Hall brought in a variegated form from Japan called ‘Variegata’ which has all gold, all green and a mix of gold variegated green foliage all in one apical whirl! It is also not the only variegated form. ‘Janssen's Variegated’ (pictured at right) is similar to ‘Variegata’ while the slow growing ‘Yellow Dream’ (pictured below) has all yellow foliage and is better suited to light shade during the heat of the afternoon. Both of these cultivars can be seen at Frelinghuysen thanks to Mr. Frank Goodhart who generously gifted the trees to the arboretum. For a deep green form, it is hard to beat ‘Wintergreen’. Raised as a seedling by the Horticulturist Dr. Sid Waxman (1923-2005) at the University of Connecticut, it was named in 1985. ‘Wintergreen’ is often totted as one of the very best deep green forms with a narrow pyramidal habit, allowing it to shed snow loads. It is reportedly hardy to zone 4. For a more compact deep green form consider ‘Picola’, which is also planted at Frelinghuysen thanks to Mr. Goodhart. The foliage is much shorter than other forms and it develops into a dense pyramidal plant of more modest heights.

Sciadopitys is hardy in zones 5-7 and grows best in full sun, except in warmer regions of zone 7 where light shade is appreciated. Well-drained, humus rich soils with an acidic pH are best since the foliage becomes chlorotic in alkaline soils. In addition, do not place plants in wind-swept sites. In these locations the plants often become misshapen and grow at an

angle away from the prominent winds. It is not unusual for plants to develop several leaders when young, which is often overlooked due to the initial slow pace of growth and density of the plant. As the plant ages, the multiple upright stems can result in a weak branch structure called co-dominant leaders. When these trees are under heavy wind or snow load, these compromised limbs can snap as the diameter of the stems and their weakness increase.

For me, part of gardening is gaining an appreciation of the plants themselves and how they adapted to an ever-changing world of climate, insect and animal life. That is what makes beautiful plants like Japanese Umbrella Pine great fun. Neither a Pine nor a conventional evergreen, its glossy 'foliage' may fool you but, it also reveals a wonderful story every garden and gardener should share!

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