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Sciadopitys verticillata (Japanese Umbrella Pine), #1065-1067

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Grace Kubat

April 23, 2021

BIO 140: Humans and their Environment

Salve Regina University



Grove of Japanese Umbrella Pines

Sciadopitys verticillata

ID# 1067

Over the span of this semester, me and my fellow classmates chose individual trees to collect weekly observations on. The trees selected come from the University's extensive arboretum, and our observations help to contribute to the monitoring and care of the trees on campus. I ended up selecting a grove of trees located on the southeast side of Gerety Hall, right by a group of park benches and near the library. The trees that I observed were three Japanese umbrella pines, and the specific tree was marked as tree #1067. I was surprised to find the significant cultural value these trees have, and I was also interested in how rare and unique they are.



Figure 1: Outlined in red are the three umbrella pines that I observed. From left to right: Tree #1067, Tree #1066, Tree #1065.

When researching information about my tree and its characteristics, I found an article from SUNY Orange about their International Tree Tour, a gardening website, and information on North America's largest stand of mature Japanese Umbrella Pines from umbrellapines.com to be most helpful. Japanese umbrella pines (*Sciadopitys verticillata*) are actually not true pines, and are coniferous evergreens native to Japan (in which the species is known as "Koya-maki"). Japanese Umbrella Pines are the only remaining species in its genus, contributing to its rarity and high value. Research suggests that other species of umbrella pines existed in the northern hemisphere prior to the ice ages, however, the Japanese umbrella pine became the only species to sustain the warmer temperatures of the Japanese islands. Because of this, umbrella pines almost exclusively exist in the ecosystems of Japan. The trees grow in acidic, well-drained soils, and prefer part-shade; though they can also grow in shade or full sun. Kiso Valley in Japan is perfect for housing umbrella pines, and is known for its association with the species. Shaded by active volcanoes located between Osaka and Tokyo, umbrella pines are able to thrive in this biologically unique ecosystem. When observing the grove of *Sciadopitys verticillata* on campus, I found that the trees were supplied with soil and light requirements that replicated their native ecosystem. The grove has plenty of shade (provided by surrounding evergreens), with some parts more exposed to sun. I also noticed that the trees are growing in mulch, which helps to manage the amount of water in the soil. Due to the species' rarity, Japanese Umbrella Pines self-pollinate, meaning that the species lacks genetic diversity and is thus weakened outside of its native habitat. It is because of this, in addition to its slow growth rates and rarity, that the species is considered non-invasive in the United States.

Due to the species' age and rarity, Koya-maki also holds significant cultural value. Umbrella pines are considered to be "living fossils", as they date back to the Triassic period

before the dinosaurs, and their genetics have remained virtually unchanged for around 250 million years. They are one of Japan's five sacred trees, and are the official tree of the Kyoto Prefecture. Historical evidence suggests that thousands of years ago, a Japanese Umbrella Pine was the center of worship in Kyoto thousands of years ago. In 1310, a Buddhist temple was built on the believed site of this tree, thus giving the species a close relationship with temples in Kyoto. The trees are also culturally associated with fertility, and legends claim that women would touch the whorls of umbrella pines in the hopes of having healthy children. Japanese Umbrella Pines were also utilized for traditional shipbuilding. Their wood is waterproof and rot-resistant, making it an ideal material for hulls to be constructed of. Their bark was also used to make oakum, which was traditionally used to caulk ships and construct lines. Today, umbrella pines are prized for their ornamental value, and currently are not used for industrial or pharmaceutical use.

When observing the grove throughout the semester, I did not notice any significant changes. Japanese Umbrella Pines are coniferous evergreens, meaning that in cold weather, the trees do not become fully dormant, thus retaining their needles and cones. In fact, the same needles can remain on a Japanese Umbrella Pine for three to four years. Because of their evergreen nature, I mostly focused my observations on the groves' general characteristics and the presence of their pinecones and needles.

Of the three trees in the grove, I chose #1067 to measure. I found that at breast-height (1.2 meters) the diameter of the trunk was 56.9 cm, and the canopy circumference was calculated to be 6.5 m. Lastly, I calculated the height of the tree to be 14.85 meters.

When first observing the grove, I noticed that the trees' low-hanging branches have been cut. This is a common pruning practice when it comes to some species of evergreens, and is done

for aesthetic purposes and to keep the canopy manageable and healthy. The bark of the pines is very fibrous, and relatively soft to the touch. The bark color is a deep reddish-brown with lots of texture, giving it an almost “wavy” appearance. The bark of the umbrella pines had a strong, woody scent that was particularly noticeable when standing close to the trunk. There are also numerous knots and whirls in the trunks of the trees, while some also had large protruding growths from the formation of branches.



Figure 2: Upper part of the trunk, showing where branches have been cut.

Figure 3: Up-close texture of the bark of #1066

The needles of the umbrella pines are very thick and long, averaging to be about six to eleven centimeters in length. They grow in umbrella-like shapes on the branches, thus giving the species its namesake. In the cold winter months, I noticed that while the needles stayed on the tree, the canopy generally appeared to be slightly sparser than it did in the warmer months. Some needles even had turned brown and fallen off of the trees. When the weather began to consistently warm

up around mid-April, the canopies of the grove appeared fuller, indicating increased needle growth. New growths of pinecones also became more numerous. These new cone growths were small in size, and grew in clusters of small, brown spheres that had a scaly texture.



Figure 4: Multitude of pinecone growths



Figure 5: Closeup of a new pinecone

Even in the warmer weeks of April, I still noticed needles on the ground, along with some pinecones. However, there were many extremely windy days in March and April, meaning that the tree may have been exposed to some strong winds that had knocked off any loose cones or needles.



Figure 6: Fallen pinecone and dead needles.

When observing the cones themselves, I found them to be very unique. Like most other species' cones, the umbrella pine's were dark brown in color. The individual sections of the pinecone appeared to be thicker than a typical pinecone. I thought that all together, the sections resembled a growth of mushrooms or fungi. The cones are fairly weighty, considering their thickness. Towards the top of the canopy, some cones grew to be relatively large, appearing to be about the size of my hand. The ones closer to the ground, however, were slightly smaller.



Figure 7: Close up of needles on one of the trees

Figure 8: Pinecones growing up the canopy

All of the trees in the grove seemed healthy and well-taken care of. However, I noticed that two of the umbrella pines had a large portion of its canopy that was extremely sparse. There is a very limited growth of needles and cones in parts of tree #1067 and #1065. Considering that all three trees are very close together and have overlapping canopies, this may indicate an increased competition of sunlight between the individuals. The sparse patches could also indicate a health issue that affects those particular trees. It may be worthwhile for the University to further investigate this issue. Considering that Japanese Umbrella Pines are considered an “at-risk species”, it is important that individual trees are monitored for indications of issues that may potentially harm the health of the population. The University may also want to consider potential actions to aid with conservation. This may include conducting research on trees, educating others

on how to properly care for Japanese Umbrella Pines, or even saving seeds in order to grow saplings in the future.



Figure 9: Dense canopy of tree #1066

Figure 10: "Hole" in canopy of tree #1065

By observing this grove of Japanese Umbrella Pines this semester, I was able to learn a lot about the species. It was interesting to learn about the extensive past that this species has, and how it's incredibly unique history played an important role in Japanese culture and Buddhist religion. While the trees did not undergo significant change while I observed them, I was able to learn more about how evergreens experience seasonal changes, and exactly how long a tree is able to hold onto its needles and cones for. This project helped me to develop a strong appreciation for this species and made me realize how urgent action needs to take place in order to protect rare

and significant species such as the Japanese Umbrella Pine in order to future generations to also appreciate the species' history, evolution, and cultural importance.

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