A Tree of Many Stories

Ginkgo biloba! To most individuals, those two words signify a pill that reduces memory loss and mitigates coronary issues. However, to the plant lover, it represents not only the tree from which that pill is conceived, but also a tree that has numerous stories to tell!

Ginkgo biloba is a large shade tree native to Eastern China, which often reaches heights of 80-100' tall and over 100' across after 150 years as seen in the picture on the right, taken at Smith College in Massachusetts. Commonly called the Maidenhair Tree, its first story revolves around its earthly age. Despite resembling a typical shade tree like an Oak or a Maple, it is actually more closely related to the ancient Cycads, with *Ginkgo* fossils dating back over 270 million years. In fact, it is the only living member of its family, the Ginkgoaceae! This ancient plant was described and named by Carl Linnaeus in 1771. Linnaeus based the genus name on a mispronunciation of its name in Japanese by Engelbert Kaempfer (1651-1716), a German naturalist and physician who described plants from Persia to South-East Asia and Japan. During a trip to Japan in 1690, Kaempfer misunderstood the English translation of this tree to be Ginkyo rather than Ginnan. The species epithet of *biloba* was provided by Linnaeus and comes from the Latin bis or two and loba for leaf, referring to the twice lobed or fan-shaped foliage. The common name of Maidenhair is from the resemblance of the leaves to those of the Maidenhair Ferns, found within the genus *Adiantum*. The foliage emerges from short spurs that are located along the branches. The green foliage is noted not only for its unusual shape, but also the interesting venation. The leaves have parallel venation that originates at the base of the leaf and splays outward. This type of venation limits the leaves to grow or expand only along the margins. More advanced plants have a netted or reticulate venation, allowing them to have multiple points of growth during spring, which in turn allows them to develop more complex leaf shapes.

Its age is the source of numerous additional stories. The plants are dioecious, with specific plants sporting pollen producing male flowers (as seen at right) and others female flowers and seeds. In and of itself, that is not unique, since numerous more advanced plants are also dioecious, such as hollies. What is unusual is that once the pollen from the male flower is windblown to the female, the male gametophyte or sperm carried within the pollen produces 2 tails or flagella that allow it to swim a short distance to the egg or female gametophyte, much like the more primitive ferns and mosses. The pollen from Pines and conifers that developed subsequently lack flagella and developed pollen tubes, an advancement that was also adopted by flowering plants that developed over 100 million years later. Lastly, its age is expressed by its vascular system; similar to Pines and other ancient gymnosperms, water is transferred from the roots to the tree top by Tracheid Cells, which are long, thin walled cells that lack any openings at the cell ends for water passage; water merely moves slowly up the tree by passing through the cell walls. By contrast, flowering trees like Oaks and Maples have additional water transferring cells called Sieve Tubes, with openings at the ends of the cells that allow water to proceed quickly upwards. The later is obviously superior when water is ample, but during prolonged periods of limited rainfall, a predominance of the Tracheid Cells allow the plant to 'rule'! Its tough constitution was also evident after the bombing of Hiroshima during WW2; six trees that were located near the epicenter of the bomb blast were severely burned, but re-leafed and continue to grow to this day!

The female trees and the resulting nuts have a story that is both a blessing and a curse. The nuts have an outer fleshy coating containing high levels of butyric acid, which not only smells like vomit, but can create a dermatological reaction similar to poison ivy! By contrast, the nut is highly prized for its taste and health benefits in Asian cuisine. It takes upwards of 40 years before the sex of a seedling plant is expressed, so it is often best to purchase a grafted male selection if a female plants is not desired. There are also numerous cultivars available that display more compact or upright habits, as well as different leaf shapes (the cultivar 'Saratoga' is pictured at right).

For the NJ Gardener, the best story is the wonderful habit that the entangled and upright web of branches that develop with age and the golden yellow fall color (pictured below right).

Mystically, all the golden foliage falls during the morning following the first hard frost, creating a rather romantic rain of golden leaves! Best planted in full sun in a moist and yet well-drain soil, this denizen of years long gone has many stories fit for a NJ Garden!