The Tree of Immortality

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The search for the Fountain of Youth dates back at least to the writings of Greek historian Herodotus in the 5th Century BC. Notable figures from Alexander the Great to Juan Ponce de León searched in vain for a fabled spring from which a drink could halt the ageing process. If such healing waters ever did exist, I suspect the ginkgo tree (*Ginkgo biloba*) may have slurped them dry more than 200 million years ago, because recent studies show that this "living fossil" can grow for thousands of years without any sign of faltering on a cellular level.

The term senescence is the decline in vigor that happens to all – or nearly all – living things as they close in on their kind's average lifespan. Of course this varies by individual, and one's environment plays a part as well, but by and large, longevity is a factor of what species you are. There are marine barrel sponges which apparently live for 2,000 years, and some land tortoises make it past the two-century mark. On the other hand, from the time it emerges out of the water, a mayfly has but 24 hours to find a mate before its clock runs out.

Trees also run the age-gamut. Bur and white oaks, massive and picturesque trees native to our area, can live eight centuries or more in good health, while eastern white cedars found on the Niagara Escarpment were seedlings during Europe's Dark Ages. In the West we have coastal redwoods older than 2,000 years, and giant sequoias which have seen more than three-thousand winters. Impressive as this is, these old-timers still face the slow decline of senescence.

Familiar landscape trees like European mountain-ash and some white-barked birches are old at thirty years, and ancient at forty. As an arborist, I often have to explain that the cells of such trees simply "wear out," and that no amount of TLC can keep them alive beyond a certain point. For reasons not well understood, when a tree goes over the hill and reaches its programmed end of the line, it begins to fade on a molecular scale. A tree gets less able to photosynthesize, protect itself from diseases, or make viable seed, for example.

However, a study published on January 13, 2020 in the *Proceedings of the National Academy of Sciences* indicates that the ginkgo tree, native to China, gets old but does not "age" in the way we normally think about that process. Dubbed a living fossil because as a species it has not changed in 270 million years, the ginkgo is best-known to North Americans as a street tree. It earned a place in the hearts of arborists and urban planners because it can tolerate harsh air pollution as well as heavy road-salt use and high soil pH, conditions fatal to many other tree species.

Also known as the maidenhair tree, the ginkgo is cold-hardy to Zone 4, and matures at between 15 and 25 metres (50' – 80') tall. Its unique fan-shaped leaves turn a brilliant yellow in autumn, and seem to drop *en masse* within a short period, often just one day or two. Its leaves are the basis for ginkgo extract and powder, used for millennia as a medicine, and sold as a nutritional supplement to help facilitate blood flow. Studies done in the US by the National Institutes for Health did not find any measurable benefit from consuming ginkgo, but neither did they find any problems with it.

Unlike most trees, the ginkgo is *dioecious*, a fancy word for having male and female flowers on separate trees. This is important to keep in mind if you wish to plant one in your yard, because female ginkgoes bear a nut-like seed encased in fleshy pulp. After the seeds drop, this pulp decays. It stinks like rancid butter, and is almost as slippery. Most ginkgoes sold at nurseries are males, but ask just to be sure.

Conducted in China's Hubei and Jiangsu provinces, the ginkgo study examined 34 trees ranging from 3 to 667 years old. It looked at genes related to the making of chemicals that protect against disease, and found the same level of protection in trees of all ages. As molecular biologist Richard Dixon of the University of North Texas told CBC Radio's Bob McDonald on a *Quirks and Quarks* segment which aired on February 28, 2020, "In relation to the immunity of the plant against stress or disease, it was hard to tell a 600-year-old tree from a 20-year-old tree." I'd wager that line will show up in a marketing campaign somewhere.

Another author of the study, Jinxing Lin of Beijing Forestry University, allows that after thousands of years rooted in the same place, assuming it can avoid bulldozers, chainsaws and storms, a ginkgo tree "might eventually die of old age." That's about as close as a scientist can get to saying ginkgoes are immortal.

For humans and other animals, and every plant save perhaps the ginkgo, there's no way to dodge senescence, which shares a Latin root, *senex*, with senility. In that regard I envy trees. Their decline is a critical part of the forest life cycle, plus they don't have to remember where they left the car keys, or the car for that matter.