In Appreciation of Trees; Happy Arbor Day from Agdia!

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Angel Oak Tree

Humans seem to be hardwired for success in the manipulation of our subjective environments via technological advancements in agriculture, communication, construction, energy production, medicine and transportation. Unfortunately, the progress meant to make our lives more associated tends to disassociate us, paradoxically, from the ancient, indispensable systems that make human existence possible. On this Arbor Day, I will stop preaching and urge reflection on the indispensable contributions of some of the hardest working members of the natural world: trees.

African baobab

It is easy to look at an iconic mature tree and appreciate its **aesthetic value**; indeed, few living spectacles can match the awe of a 3,000-year-old giant sequoia reaching 400 feet into the atmosphere, an African baobab storing 30,000 gallons of water in its trunk, or a live oak that encompasses an acre of land in its shade. Nevertheless, all trees, from those planted on bustling city streets to those persisting on remote, windswept mountainsides, deserve our consideration, regardless of age and size. Today's acorns are tomorrow's forests.

I suspect most people associate trees with **building materials** and **food production** before anything else. Prior to the industrial revolutions, a limiting factor to a society's growth was its access to wood for shelter construction, ship building and fuel for cooking. Due to its flexibility, relatively light weight, superior insulation properties and sustainability, wood is still prized as a building material worldwide. Moreover, while field crops dominate world markets, many of our most valuable crops, such as almonds, apples, avocadoes, cacao, citrus, peaches and pecans, are harvested from trees.

Cocoa fruit

Trees provide many architectural and engineering solutions to problems concurrent with human proliferation. As civilization inevitably amasses within megacities and the adjacent suburbs, the placement of multi-functional greenspaces, including tree plantings, within population centers becomes requisite. Trees can be planted to act as **noise barriers** through deflection and absorption of sound. Hard surfaces, such as manufactured walls, will alleviate noise pollution for those behind the wall; however, this is via deflection only, sending the noise elsewhere. Trees **produce microclimates** with shade, cooling heat islands, and act as **filters for toxic particulates in the air** produced in industrial areas.

Arborvitae hedge as noise barrier & privacy fence

Trees and greenspaces they occupy **mitigate stormwater runoff and promote soil infiltration**. Stormwater evacuates hard surfaces at high rates and volumes into storm drains, channels and underground pipes, which empty to adjacent watercourses. During heavy downpours, this deluge can alter creek and stream geometries through erosion and sediment deposition, destroying aquatic habitats. Leaf canopies along with crown and trunk architecture intercept precipitation, decreasing rate and volume of water reaching the ground. Moreover, root growth conditions soil for improved water infiltration and erosion abatement while drawing large amounts of soil water via transpiration to be used in photosynthesis.

Stormwater runoff

Decaying tree enriching the soil

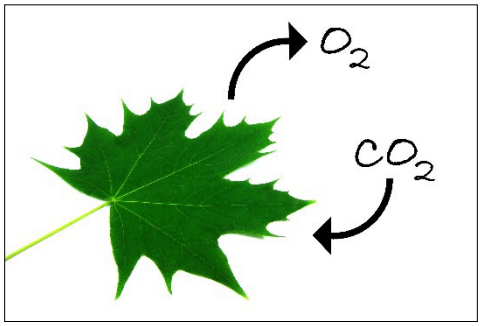
Trees **provide important wildlife habitat** worldwide, aerial and subterranean. Trunks and canopies provide countless species with food, shelter, reproductive sites and protection from ground predators on every continent, excluding Antarctica. Indeed, tree canopies can foster unique ecosystems for amphibians, birds, insects, mammals, reptiles and even other plant species. Root systems, for obvious reasons, are typically overlooked as habitat. Nevertheless, roots and the rhizosphere are home to innumerable, indispensable species of bacteria and fungi, including nitrogen fixers and symbionts, such as rhizobia and mycorrhizae. Moreover, decaying leaf and wood matter **enriches soil habitats** as it breaks down through the activity of insects and microorganisms. Natural tree mortality is part of the carbon cycle and altogether different than mass tree removal via deforestation or invasive pests and diseases, such as the emerald ash borer and chestnut blight.

Three-spotted owlets in shelter provided by tree

Emerald Ash Borer

Chestnut blight

Through **transpiration**, trees pull **carbon dioxide** from the atmosphere and water and soluble nutrients from the soil. Then, with a little help from the sun, water and carbon are transformed into carbon-based energy and structural molecules via **photosynthesis**. The by-product of photosynthesis is a tree's most important contribution to life on Earth: oxygen. Trees **maintain oxygen levels,** essential for life on the planet. Without these processes, most life on Earth, including humans, would cease to exist.



Photosynthesis

Current research estimates that there are approximately three trillion trees on the planet. That equates to 422 for every person. On this Arbor Day, I recommend we sit back in appreciation of all of them.