



Hawaiian dryland forests: Seeing the Forests for the Shrubs

The term “forest” describes a diverse and complex community of plants and animals that are adapted to their native landscape. Its not about how many or how tall the trees are. High islands like Hawai‘i nei tend to have dry and wet sides as dominant wind directions bring in clouds and moisture from the ocean. Windward, or facing the clouds, means wet. But on the leeward sides, cloudless winds can dry-out rocky soils under a tropical sun. Some of those rocky soils are formed from young, dark lavas that absorb heat, raising temperatures and lowering humidity. When rain comes to these places, it may fall in just a few dramatic annual events, making plants wait long dry months between unreliable storms. Such desert conditions are the makings of a Hawaiian dryland forest, even in locations that get up to 50 inches of rain per year, either half-way up the mountains or close to the ocean. An unbroken green “lei” of forest once encircled each mountain in Hawai‘i, but the plant species in that *lei* changed from wet to dry-adapted, and often, the trees look more like shrubs.

Blooming Where You Are Planted

Dryland forest plants adapt to conditions that life gives them in a number of ways. Canopy trees like this *wiliwili* lose their leaves in summer months to conserve moisture, and often produce masses of flowers on leafless branches. Thicker leaves and short, dense trunks means less surface area to wick away moisture. Some trees like *naio* have light or silvery bark, reflecting sunlight instead of absorbing it. All of these plants take advantage of pockets of moisture in the soil, confined by lava formations, even growing where underground lava tubes funnel precious fresh-water past the roots. Herbaceous plants survive the long game by sprouting, growing, blooming and scattering seeds in the time it takes to dry the soil after a chance heavy rain, regardless of the season. Many species simply stop growing between rains. Opening a blossom right before nightfall, like the *maiapilo* can save a little moisture, but more likely its a strategy to get pollinated by an endemic and endangered *Manduca blackburni*, Blackburn

hawk
moth.



Pueo (*Asio flammeus sandwichensis*) are ground-nesters and the top native predators in dryland forests. This owlet waits for its parents to return.

Pua kala (*Argemone glauca*), an endemic poppy.



If These Are Desert Plants, Where Are the Poisons and Thorns?

Before humans found their ways to Hawai‘i, large grazing animals could not make the 2500 mile swim. Over time, without nibbling mammals, most native Hawaiian plants put their energies toward other things besides making poisons or growing thorns. There are no native cacti or succulents in Hawai‘i. Desert plants here could afford to grow unprotected true leaves and blossoms. Or at least they used to.



Forests Are More Than Plants

Dryland forests are the most endangered ecosystem in Hawai‘i: only 2% remain, yet are home to 40% of all native land plants, insects, spiders, snails, birds, even our native bat. Slash and burn took some of these forests in early Hawaiian times, but wholesale destruction began when early European sailors brought grazing animals such as goats, deer and cattle. Introduced rats devour rare native seeds. Then came burning to create more grazing lands, and finally, construction bull-dozers. For decades, developers and landscapers have focused on replacing conservative native plants with gaudy, faster-growing, alien landscape plants that fit our stereotypes of “colorful tropical vegetation,” often relying on distant water sources to create the illusion of lush oasis’ on the dry sides of the islands. Introduced plants can become invasive weeds that compete for space, harbor new insect pests, or spread diseases. Climate change threatens to shift rainfall patterns to higher elevations or dry some parts of Hawai‘i even further. Fewer rain events are expected, but will be more torrential and eroding.



What We Are Doing

At ‘Āhihi-Kīna‘u NAR, and on all Division of Forestry and Wildlife lands, conservationists race against time to fence out alien grazing animals while biologists document native plants, invertebrates and birds. Botanists with the Plant Extinction Prevention Program (PEPP) collect seeds of critically endangered species to replant after grazers are gone. When forests are rebuilt, even native birds can be returned.



For more information:

Plant Extinction Prevention Program (PEPP)

<http://www.pepphi.org/>

University of Hawaii, Botany

<http://www.botany.hawaii.edu/faculty/carr/natives.htm>






Maui Nui Botanical Gardens

<http://www.mnbg.org/>

Fountain grass
(*Cenchrus setaceus*),
introduced as an
ornamental,
now threatening
to take over.



What You Can Do:

-  **Stop importing new plants.** Hawai‘i has over 2,400 native plants, many species unique to these islands and significant in Hawaiian culture. In the last 200 years, we have added over 31,000 new species, as if the remarkable beauty and diversity already here was insufficient. Native Hawai‘i is enough.
-  **Don’t be a vector:** Stay on marked public trails and clean your shoes and gear of weed seeds and mud before and after each hike.
-  **Keep them wild, collect only photos and memories.** Leave the flowers to the pollinators, the seeds to the birds; wild plants should stay where nature planted them.
-  **Reduce your personal carbon footprint,** fight climate change at home to fight it on a global scale.
-  **Help others to “see” the dryland forest by sharing what you’ve learned** with landscapers, developers and gardeners.

