Biodiversity Needs You

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2023

The term "biodiversity" (or biological diversity) comes up frequently in discussions about the natural environment, but what exactly does it mean and why should it concern us? Biodiversity refers to the variety of living species on Earth, including plants, animals, bacteria, and fungi, as well as the communities and networks they form. Think of it as the layer of living organisms that occupy Earth's lands and oceans. To define the level of biodiversity in a specific habitat, scientists consider how many different species are present as well as the quantity of each species, the physical distribution of those species over land or sea, and the level of complexity in the interconnected communities they form, which are known as biomes or ecosystems.

This biodiversity contributes to human wellbeing, providing food, fuel, breathable air, potable water, fertile soils, productive lands, and pollination. Over the last century, humans have caused rapid ecosystem alteration and massive loss of biodiversity across the planet—changes that inevitably affect humans as well. Major direct threats to biodiversity include habitat loss and fragmentation, unsustainable resource use, invasive species, pollution, and global climate change. These threats have caused an unprecedented rise in the rate of species decline and extinction.

Using a variety of native plants in our gardens will welcome wildlife to the neighborhood. Photo by Laura Lovett

The good news is that it is within the individual's power to take actions to help support species survival and the health and integrity of ecosystems. Native plants in home gardens can aid local plant communities fragmented by expanses of lawn grass and imported plants like jasmine, roses, and hydrangeas that provide little for our wildlife. If we take our gardening cues from nature, some of the intricate relationships between plants, insects, birds, and other animals can be revitalized. If we each make small changes, together they become significant. Given that so much of our land is under cultivation or development, it is more important than ever to do what you can in your own backyard.

Any native plant added to your garden will help support important insect populations that are the foundation of the food chain. One example is helping plant-pollinator interactions. The timing of plant flowering and pollinator activities each year are cued by temperature, moisture, length of day or a combination of these factors. Climate change is slowly altering the timing of temperature and moisture cues, resulting in shifts in the timing of flowering and pollinator activity. In some cases, this may decrease the overlap in timing, which may lead to depressed pollinator activity and pollinator starvation. Higher biodiversity and habitat complexity in our gardens can aid these relationships by supporting a longer overall flowering season, filling in gaps in pollinator food sources that may arise.

Here are some ways you can increase your garden's diversity, extend flowering time, and help pollinators thrive in your home garden:

• **Plant a broad suite of flowering species**. Something will always be in bloom. It is especially important to include plants that flower from the early months of the year into late fall to provide food sources on the margins of the season.

Of the species that flower early, manzanita (*Arctostaphylos* species) is an important one. If you have a garden, try to find a space for a least one. There are many varieties from groundcovers to large shrubs. Other early bloomers include redbud (*Cercis occidentalis*), wild lilac (*Ceanothus* species), currants and gooseberries (*Ribes* species), goldfields (*Lasthenia* species), California poppies (*Eschscholzia californica*) and buttercups (*Ranunculus californicus*).

Late bloomers include narrowleaf milkweed (*Asclepias fascicularis*), coyote brush (*Baccharis pilularis*), California fuchsia (*Epilobium canum*), goldenrod (*Solidago* species), tarweeds (*Hemizonia* and *Madia* species) and Pacific aster (*Symphyotrichum chilense*). Most of these will spread out rapidly, so be sure to choose a location where you have space for them.

• **Go for complexity**. A simple landscape like a lawn supports very little life. Try to have many varieties of plants. Sites with higher overall richness (number of species) exhibit greater length of flowering.

• **Where possible, encourage genetic diversity**. Planting multiple individuals of the same species may extend the flowering season, as individual plants will flower at slightly different times. In a larger garden you could consider planting from a variety of seed sources where appropriate, as ecotypes from warmer/drier conditions tend to flower earlier than those from cooler areas.

• **Utilize the natural microclimates** on your land: south-facing slopes and areas with more direct sunlight will flower earlier, while north-facing slopes and areas with more shade will flower later. This can extend the flowering season up to a week or two, depending on the plant species present. It is particularly beneficial if these two options are within close range of each other, enabling even the smallest of pollinators to make use of both options as the season progresses. You can create varied microclimates in your yard by different amounts of watering, use of structures for shade, or by planting vegetation of different heights that can create shade. The Marin chapter of the CNPS lists plants for a variety of conditions on its website, cnpsmarin.org

• **Weed!** The removal of competing plants you don't want greatly aids young plants in getting started and can extend flowering time in some species. This may include direct pulling, or grazing and mowing at a larger scale, if done at the right time to reduce competitors.

• **Make space for nests.** Leave some bare ground (don't mulch everything!) and dead plant stems as material for nesting. The majority of our native bees nest in the ground and can't dig through mulch.

• **Use water strategically**. Additional water may extend bloom time as it will allow some species to produce more flowers and continue flowering into the drought of summer. Be judicious with your water, however. If the plant has set seed, additional water won't help.

• **Avoid pesticides.** These cause damage to the root microbiome and to pollinators. There are many nontoxic ways to keep things in balance in your garden. Marin County Parks manages a website that offers homeowners lots of resources on integrated pest management at marincountyparks.org/projectsplans/ipm

• **Avoid fertilizer.** It encourages quick growth of competitive grasses and alters the nutritional qualities of vegetation. Native plants should only be given green compost or mulch—those without animal products in them.

This article was originally written for the Marin Chapter of CNPS.