

LIVING LABORATORY GARDEN

ON-GOING CURRICULAR AND EXTRACURRICULAR ACTIVITIES

San Bernardino Valley College

Last Update April 16, 2022

Biology Dept at SBVC

Brief Background

Since the design concept charrettes of 2014-2015 led by Ben McCoy from EPT Design, and Ernie Loera, SBVC Facilities Project Manager, and in consultation with the Biology Department faculty, students and the community-at-large have been at the core of discussions and innovation.

The **Living Lab Garden** was installed to support water saving patterns by the District and also serve **five vegetation zones**: 1) **Fossil Garden** (FG), reflecting the Mesozoic geologic period; 2) **Coastal Sage Scrub** (CSS), reflecting a protected bird's critical habitat in Southern California (also known as soft Chaparral); 3) **Chaparral** (Ch) reflects SB mountains foothill vegetation; 4) **Desert** (D) replicated both Mojave and Colorado desert vegetation while also comparing to other non-locals; and 5) **Oak Woodland** (OW). This latter containing a mixed vegetation that also includes some perennial crops (fruit trees) and raise beds (Map on page 3 of designated vegetative zones). DG paths accentuate the accessibility to these varied vegetative zones to faculty, students, staff, and the community at large while also being maintained against invasive non-Californian species. Indirectly these zones also strengthen the Inland Empire's varied ecology and ecosystems.

Since original installation, the plant palette has been actively expanded every semester to support the growth of these zones while also replacing failed plantings. Other plantings have occurred via introduction from wind and bird visits (e.g., Cardinal monkeyflower, local to Mill Creek and Santa Ana River).

Our current curricular and extracurricular activities continue to provide the highest value of education, outreach, stewardship, and physical and mental health to our various stakeholders of San Bernardino Valley College.

Summary of Departmental Activities

The following list is non-exhaustive but represents the varied endeavors by faculty and students:

1. Outdoor laboratories and lectures for various Biology courses.
2. Semester-long projects conducted by students every semester.
3. Raise bed utilization
 - a. experimental conditions (e.g., soil microbiome)
 - b. horticultural annual crops (e.g., cantaloupe, squash, peas, herbs), plant domestication and allelopathy
 - c. community-centered fresh produce (*intersecting environmental and economic sustainability*)
4. Interpretive signage of plants and biological research to support current community member walks and photography, include brochures and guided student ambassador tours.
5. Organization of Annual Spring plant sales (plant starts and seed cultivation); *first sale was projected for late April 2022*

6. Cataloguing animal biodiversity annually, Fall and Spring seasons, and nesting success of resident species
7. Continue utilization of shade canopies (installed in Fall 2020)
 - a. outdoor lectures
 - b. outdoor laboratories
 - c. Department meetings and socials

Summary of Divisional Activities (Science Division)

The following list is non-exhaustive but represents the varied endeavors by faculty and students:

1. California Geography and Physical Geography assignments (*Geography Department*)
 - a. Quantifying native plants, photography and identification
 - b. Essays on native/endemic species
 - c. Bird biodiversity
2. Fossil Garden (FG) plant walk (Geology Department)

Summary of Potential Inter-Divisional, Inter-Departmental Activities

1. Culinary arts; Herb and Fruit Collection, application of local organics
2. Human Allied Health (nursing, pharm tech, psych tech); Biomedical properties in plants
3. Ethnic Studies; Calif. Indigenous people use of local native plants
4. Ethnic Studies; Calif. Indigenous people use of local animals within cultural traditions and linguistic aspects
5. Physics; seed spread fluid dynamics and/or water/plant hydraulics
6. Music; Soundscape of urban and migrant bird song

Examples of Plant-Plant and Plant-Animal Interactions

Oak Woodland Zone [*area subject to removal, tech building*]

1. Bee visitation in Orange, Apple, and Apricot trees
2. Coast Live Oak, Acorn Woodpeckers and California Scrub Jay, resource utilization
3. Gray Ground squirrel Oak Woodland microhabitat utilization rates compared to other areas on campus
4. Sugar Bush and Toyon berries, visitation by berry-eating birds
5. Understory arthropod biodiversity in Pines and Oaks.
6. Toyon, Conifers, and Oak chemical inhibition, competitive interactions
7. Bird insectivory in pines and oaks
8. Butterfly visitation on Seep Willow (Mule Fat)

Desert, Chaparral, and Coastal Sage Scrub [*area subject to removal, tech building*]

1. Pollinator effectiveness
2. Pollinator biodiversity of California native plants
3. California native bee and bird visitation in flowering plants
4. Nectar quality and visitation rates in flowering plants
5. Seed collection and bird insectivory in various plants
6. Bird territoriality and nesting success

In Southern California, these diverse plant communities have also been negatively affected, reduced in size, due to land conversion for urban development.

Living Lab Garden

OAK WOODLAND (OW)
Habitat

These woodlands are the most iconic and attractive landscapes dominated by one to many different deciduous or evergreen oaks. Acorns are a nutrient-rich food source for many species of wildlife. Reptiles and amphibians benefit from shelter provided. Oak canopies have positive effects on local climate as the canopies absorb more sunlight than open grasslands.

CHAPARRAL (Ch)
Habitat

The fifth most abundant habitat in Calif. Many plants have sclerophyllae (evergreen, small, tough, and thick) leaves. Fire are a natural and critical ecosystem process of this vegetation along with its large diversity of beneficial fungi. Fungi play a critical role such as linking multiple individual plants through fungal networks, assist in mineral uptake, increase survival of seedlings, nitrogen cycling within the plant community, and they even benefit air quality.

DESERT (D)
Habitat

Sparsely vegetated giving the impression that there is little life, but the Mojave and Colorado Deserts are unique for their amazing display of winter and spring annuals, colorful succulents, and endemic animals. These deserts were critical in sustaining hunter-gatherer human populations with water, food, and fiber.

COASTAL SAGE SCRUB (CSS)
Habitat

The most sprawling habitat. Plants typically short in stature with various leaf forms (dark green, light green, and grey) and pleasant fragrances, more noticeable after the rains. CSS, also called 'soft chaparral', is dominated by drought-deciduous shrubs and many species of tube (barbaceous flowering plant) not found in any other parts of the US or the world.

FOSSIL GARDEN (FG)

The plants in this zone are relics of their particular phylum and/or family for which their fossil record dates back between 400-47 million years ago (mya). This is why these plants are considered living fossils. Preserved plant fossils may include pollen, flowers, cones, seeds, leaves, and tree trunks (petrified wood). (But today, we can still admire these living fossils!)

This living laboratory was designed by faculty members of the Biology Department with the intention to support students in their learning and engagement while on campus. We showcase some native plants of our local areas. Habitats and plants shown here may present ideas to home gardeners on design, planting, and maintenance practices that are sustainable, cost-effective, and highly beneficial to restore natural ecological functions in our urban ecosystem. This living lab is visited by lizards, resident and migrant birds, and a diversity of insects.