Plant succession studied

Green treasures emerge from dry lake

by Suzanne Granger

The body of water on the grounds of the Los Angeles State and County Arboretum has been called LASCA Lagoon by some or "the lake where the ducks are" by most visitors. But it is, in fact, a sag pond formed by the Raymond Fill Fault. When five years of drought depleted the aquifers that recharged it, the pond dried up, presenting the opportunity to study pond succession.

Pond succession, the orderly waves of plants that colonize newly opened habitat, has been well documented for northern montane ponds. Little has been done, however, with bodies of water in urbanized areas. The typical scenario shows amphibious plants—cattails and tule reeds are examples—appearing first, followed by pioneer weedy annual herbs that prepare the habitat for trees and shrubs colonizing from drier areas nearby.

Because of this dynamic natural process, the ancient Indian charm stone uncovered by Glen Erik Klevdahl was not the only treasure revealed by the drying pond bed in mid-October. My volunteer, Lois Taylor, and I found "green treasures," *aka* unusual plants, sprouting up from the mud.

What interested me most were the original plant pioneers and how they got here. The plants we call "weeds" are usually hardy plants with many admirable traits. They are the first plants to grow when a new habitat opens up, such as happened when the shrinking pond exposed bare soil for the first time in decades. Pioneer plants thrive on disturbance and tolerate a wide range of environmental conditions—poor soil as well as temperature, insolation and moisture extremes—while producing tremendous quantities of seed or spores. Those weeds that manage to find their way all over the world are called "cosmopolitan" species, the ultimate success symbol of weeddom.

Three sources

Three major sources for the pioneer plants we observed soon became evident: first, seeds from wild bird mixes brought in by visitors and, second, those brought by migrating water birds on the Pacific Flyway. The third, and the least interesting source, were those pesky weeds already known as problems at the Arboretum.

Plants from bird seed mix were concentrated near the pond edges and sandier soil where visitors fed the ducks. Broadleaf plantain *(Plantago major)* is native to Europe, but this pioneer has become cosmopolitan. It is so successful partly because its mucilaginous seeds (psyllium) have long been used medicinally by northern Europeans who brought it west with them. Native Americans called plantain "white man's foot" because it was said to spring up wherever he walked.

First rains flood lakebed

December rains that partially refilled the lake at the Los Angeles State and County Arboretum gave new hope for the New Year. Arboretum officials have their fingers crossed for 1992.

"We are pleased to see that the first heavy rains of the winter season put so much water into the lake," said Arboretum Superintendent John Provine. "When the lake went dry last summer we were afraid that it might be a permanent condition."

A normal rainy season this year may refill the aquifers that feed the lake, preventing a replay of last summer's disappearing lake episode.

Seeds of safflower or false saffron (*Carthamnus tinctorius)* are relished by birds and yield safflower oil. This beautiful plant with fragrant yellow to orange flowers would be very much at home in the Herb Garden. Safflower probably originated in Eurasia, but it proved so useful that migrating humans and birds made it a cosmopolitan plant. Today, no one can be certain of its origin.

Sunflower *(Helianthus annuus)* is a favorite snack food of countless birds as well as grounds worker Bill Fry, so it's uncertain who is responsible for the many sunflowers growing in the pond bed—Bill or the birds. Other seeds from bird mixes which germinated included Indian corn *(Zea mays)* and sorghum *(Sorghum vulgare)*, both cultivated since prehistoric times. An abundance of associated grasses indicates that bird mixes are made up of mostly grass seed. One lanky cabbage was spotted before peacocks, the Arboretum's worst weeds, tattered it. I also found amaranthus.

The bird-dispersed category provided an exciting green treasure with a new species site record for Southern California. A specimen of swamp grass *(Heleochloa schoenoides)* will be sent to Berkeley to be included in the newest "Jepson Manual of California Flora," with the Arboretum listed as the locality. The grass was found near the middle of the pond and was apparently carried from the rice paddies of the Sacramento Valley by migratory water birds. The species, native to Europe, was brought to America's east coast in ships' ballast. By 1935, swamp grass had wandered from New England to Illinois. It extended its range to northern California by 1965, and made its Southern California debut at the Arboretum in 1991. Goose grass *(Eleusine indica)* was also collected and boasts a similar history of pioneering success, but it has been here for some time.

Among the weeds already here were many like the Mexican tea *(Chenopodium ambrosiodes)* that were once invited into the Arboretum and now refuse to leave. Others include Indian shot *(Canna indica)*, Pennsylvania smartweed *(Polygonum pensylvanicum)*, papyrus *(Cyperus papryus)* and bullrushes or tules *(Scirpus)*. It was interesting to note that only one sickly seedling of passion vine *(Passiflora coerulea)*, perhaps the Arboretum's most ubiquitous weed, was found during two months of collecting pond bed specimens.

LuAnn B. Munns

This specimen of swamp grass (Heleochloa schoenoides) *will be included in the newest "Jepson Manual of California Flora."*

Primitive pioneers

Not all the pioneers were flowering plants. As Lois and I walked on the drying mud in mid-November, we heard a crunching sound as if we were walking on potato chips. The source proved to be a primitive plant, the terrestrial unicellular alga *(Botrydium)* , that thrives on muddy banks and shores. Millions of them, looking like tiny green balloons tied to strings, were shallowly embedded in the mud. With thick skins surrounding a gelatinous green cytoplasm, the cells burst with an

audible pop when trod upon. I called them "spores from Mars" until librarian Joan DeFato helped me identify them. Another primitive plant was a common moss *(Funaria hygrometrica)* growing happily in an uncommon habitat—a foot down along the sides of the deep fissures that had developed in the adobe clay lake bed.

The dried pond bed also provided a rich habitat for animals, attracting many kinds of songbirds. Most noticeable were the mockingbirds which were especially active in devouring the remaining water snails that tried to survive the drought by hiding deep in the damp mud cracks. Red whiskered bulbuls are also active pioneers. Native to Vietnam, they made their way to California from Florida where captive birds were released in 1960. Although these pretty songbirds eat fruit, they are no longer considered Class A pests by the County Agricultural Commission.

But the dry phase of Nature's cycle seems just about over—for now. Even though only one-tenth of an inch of rain has officially fallen at the Arboretum according to plant recorder Jack McCaskill, the wet cycle is returning.

By Nov. 10, water was welling up in mud cracks to within two inches of the surface, and in places the mud quivered like jelly underfoot. How could so little rain cause this? The aquifers which feed the pond accumulate rain water from a large area, including the San Gabriel Mountains which always rake more moisture out of the storm clouds than the lowlands. So this may signal the end of what to some looked like a disaster but was actually just another phase in nature's cycle, one that opened up new habitats for species waiting in the wings.

As leader of the mapping crew, herbarium curator Suzanne Granger monitors the plant collections at the Los Angles State and County Arboretum through all the seasons, wet or dry.

New roof installed on Santa Fe Depot

LuAnn B. Munns

The roof of the Santa Fe Depot was stripped to the rafters and new materials installed last fall.