

## Hail, Monarchs!

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**O**f all the seasonal visitors to Santa Cruz County the monarch butterfly endures the greatest hardship in getting here. Not only do these delicate black-and-orange butterflies fly, propelled by 3-inch wings, 3,000 miles from Canada every fall, but a complete trip takes about nine months and spans eight generations.

The only migratory butterfly species in the world, the monarch has very specific criteria for a winter home. And a grove of eucalyptus trees nestled into a small ravine in Natural Bridges State Park is one of the few places along the West Coast that fits their criteria.

The monarchs, which have been in their winter homes since late September and will remain through February, will be in peak concentrations during the next few months. They come south seeking warmth; when it's colder than 55 degrees F the butterflies find it difficult to move. Below 45, they're immobilized.

The Central Coast is an ideal overwintering zone because the ocean helps moderate the temperatures. The butterflies cluster in certain areas along the coast, from Point Reyes to Ensenada, Baja. Along the Monterey Bay they cluster at Natural Bridges and at Washington Park in Pacific Grove. Farther south, they can be found at Morro Bay State Park and at Pismo Beach.

"At Natural Bridges," says Natural Bridges park aide Lorraine Krause, "they are sheltered in a eucalyptus grove. This year we'll probably have 150,000 to 200,000 in the park at the peak, in November and December."

The eucalyptus grove offers shelter from the wind, trees for the butterflies to attach to and food. The butterflies feed, or rather drink, eucalyptus flower nectar through their long, flexible tube-like tongue, which is known as a proboscis.

"The eucalyptus are originally from Australia," explained Krause. "They bloom in November and December because that's spring down under. Before the eucalyptus were introduced to California, the butterflies clustered on pine and oak trees."

When it's cold, the butterflies gather together on the trees, with the animals layered over each other like shingles on a roof. The overlapping wings help keep the group warm, and the weight of the cluster gives it stability in the wind.

On warm sunny winter days, they leave the clusters and fly around looking for food and water. "They mainly drink water," says Krause, "rather than eat." When the fog moves in and the day cools down they cluster again, but not necessarily in the same group.

"The colder the day," says Krause, "the bigger the cluster. The clusters are well camouflaged on eucalyptus trees. They fold their wings up and the undersides of the wings, which are brownish, blend in with the trees. They look like a string of dead leaves."

**T**he camouflage effect is probably unnecessary for the monarch's survival. They have very few



HOLGER LEUKE

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predators because they feed, as caterpillars, on milkweed. They retain traces of the milkweed, which is toxic to many birds, in their bodies even after they metamorphose into butterflies.

"Any bird that has ever eaten a monarch won't go near any black and orange butterfly again. It's [the toxin] a natural protection for them," Krause explains.

More of a threat are car windshields—especially in Pismo Beach, where the butterflies cluster near the road—and habitat destruction. In California, real estate development is impinging on the monarch's winter sites. In a move to protect these habitats, Palo Alto Assemblyman Byron Sher authored a bill, which was signed by Governor Deukmejian Sept. 11, that requires the California Department of Fish and Game to prepare an inventory of winter roosting sites. The information will be used by the CDFG to make recommendations to the state, as to which sites it should acquire to protect the monarchs.

The monarchs spend the first two months in their winter homes, literally just hanging out, leaving their clusters only to feed and drink. But in January they get the urge to mate and the groves become the sites of massive butterfly orgies.

"The males die a short while after they mate," says Krause, "and the females, before they mate, get the urge to leave and seek out milkweed." Milkweed plays a critical role in the monarch's lifecycle and—some theorize—may explain what

the monarchs are doing so far north. Part of a large family of tropical butterflies, it is possible they have followed the evolution of milkweed plants northward over millions of years.

The females deposit their eggs on the milkweed, then die a short while later, after living six to nine months, an eternity in the insect world. The monarchs born during the northward migration are not nearly as long-lived.

The larva feeds almost nonstop after hatching, first on its egg shell, then begins to consume its host, the milkweed. Within 15 days the larva increases 50 times in length, and 2,700 times in weight, from a grub that fit into an egg the size of a head of a pin, to a 2-inch long black-and-yellow-striped caterpillar. To accommodate this rapid growth, the animal molts four times, and eats its old skin after each molt.

**T**he next step is metamorphosis, and the caterpillar spins a cocoon, emerging two weeks later as a butterfly. The metamorphosis is not entirely complete when the butterfly emerges from its chrysalis. First, the newly emerged monarch hangs, upside down, and pumps body fluid from its swollen abdomen into the wings, which enlarge and flatten. A few hours later, after the sun has dried and hardened the new wings, the monarch is able to fly off and continue the trek northward.

The orange wings are webbed with black veins, like leading on a stained glass window, and the edges are bordered in black, with two rows of white dots, which also cover the body. The color is produced by a mosaic of thousands of flat scales that overlap each other to cover the bare wings. They look like the monarchs that overwintered in California, but there are some internal differences.

"The February babies don't store up fat, like other monarchs," says Krause. "They only live about six to eight weeks. Their purpose in life is to mate, and look for milkweed [to nourish the next generation]." Each generation travels northward for a few weeks, mates and then dies, leaving the successive generation to continue the northward migration. Only the butterflies that are born in the late summer are longer-lived. They are also genetically programmed to make the return trip south in the fall. No one knows how or why they know where to head for the winter.

Interestingly enough, there is an eastern population of monarchs doing the same thing on the other side of the Rockies. "The monarchs we see here," says Krause, "originate on the west of the Rockies. The population east of the Rockies winters in Central Mexico. It's the same species, the same butterflies, but different geographical regions."

So next time you're bemoaning airport delays, consider the plight of the monarchs. It might take you an extra day to reach your destination, but no matter how bad the delay is, it won't take eight generations to return home.

Butterflies

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