Microclimates and the Survival of Overwintering Monarchs

by Ernest Williams

Winter is a difficult time for most living things. Because of cold and scarce food during this season, most animals get through winter by reducing activity, remaining in a protected stage of their life cycle, storing food in advance, or simply leaving and going somewhere warmer. Few butterfly species can withstand northern winters as adults. Descendants of tropical ancestors, Monarchs cannot survive the freezes that occur in their milkweed-rich summer breeding range, so with the exception of populations in south Florida, all Monarchs from central and eastern North America migrate southward to the subtropical latitudes of central Mexico to pass the winter months. There they aggregate in remarkable densities, estimated at 4 to 20 million per acre, on mountainsides about 100 miles west of Mexico City. These small mountainous sites provide the precise conditions that allow the butterflies to survive the winter.

Southward movement enables Monarchs to avoid freezes, but they have to avoid excessive warmth, too. To do so, they move high up on cool Mexican mountainsides, usually above 10,000 ft. elevation, where they form winter colonies. Like other insects, Monarchs become as warm or as cool as the surrounding air (animals like this are called ectotherms). This fact is important because their metabolic rate — the rate at which they use energy — depends on temperature. The warmer the butterflies are, the faster they burn through the energy reserves (lipids) they have stored for the winter.