

Field Notes—October 21, 2022  
Carrie Crompton

### **Pollinators in Our Yards**

My last post ended with this photo, and I predicted that in two weeks, I might see a Monarch butterfly.



**October 5, a gold-flecked chrysalis**

It took about a day for the golden “diadem” – a line of dots that halfway encircles the chrysalis – to start shining. These golden spots are tiny structures that form between the inside and the outside layers of the chrysalis case (which is composed mostly of chitin, like a lobster’s shell). These structures have accumulations of

carotenoid pigments in them, which reflect yellow light.<sup>1</sup> Carotenoids had been part of the caterpillar's diet, and now they were being sequestered in these beautiful structures. There's something about the way light is filtered by the chitin that makes them shine.

For the next thirteen days, the chrysalis looked pretty much the same every day. Then, on October 19, I noticed that the jade chitin case looked thinner, almost transparent. The outlines of the butterfly's veins were becoming visible. The gold flecks and the diadem in the chrysalis were still bright.



**October 19, 9:00 a.m.**

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<sup>1</sup> "Striking Gold: Why Are Butterfly Chrysalises Gold?" <https://askentomologists.com/2016/12/08/striking-gold/>

By the morning of October 20, the case was dark. The gold flecks were still gold.



**October 20, 8:00 a.m.**

I brought the chrysalis indoors so that I could keep an eye on it. All morning, I kept circling back to the place in front of the window where it was hanging . . . and

still, I managed to miss the moment when the transparent chrysalis cracked open and the butterfly emerged. It happened in less than ten minutes. I think the butterfly waited until my back was turned: they like to eclose in privacy!



**October 20, 12:30 p.m.**



Its wings were all crumpled from being folded up into its little chitin case, which was now just a broken shell. I set the branch in its vase back out on the porch, so the butterfly would be able to fly when it was ready to.

Its wings had unfurled from their “fetal” position. But though they’d expanded, the wings weren’t “hardened” yet. Layers and layers of scales needed to dry.



**October 20, 12:45 p.m.**

At some point, it released a splat of dark liquid – the waste material accumulated during its transformation in the chrysalis. (The butterfly weighs about half as much as the caterpillar it developed from.)



**Post-emergence excretion**



When it first emerges from the chrysalis, the butterfly has lost all memory of being a caterpillar – and it has to hook up new neuronal connections. How to see out of new eyes? Feel and smell with new legs, antennae? Taste with new tongue? How to tell time by the angle of sunlight? How to judge direction? How to fly? Where is Mexico? It needs to develop at least some of these new aspects of awareness in a matter of hours, before it spreads its wings.

Three hours after it had emerged from the case, this butterfly spread its wings for the first time. If you've been reading my posts all summer, you know that this Monarch is a boy! See those two spots on the veins close to the body? They're scent glands, for the manufacture of female-attracting pheromones. According to what I've read, they're not really needed for attracting females, but they do help us identify them as males.



**October 20, 3:30 p.m.**

Now it was late in the afternoon, very cool and windy, not a great time to practice flying. This boy stayed on the stalk all night long.

That was yesterday. This morning, a sibling emerged from another chrysalis I'd been tending. This time, I was able to observe the butterfly pumping fluids from its body into the wings to expand them. In ancient Greek, the word for butterfly is *psyche*. The other meanings of *psyche* are soul, spirit, breath. It was as though she was breathing her wings into life.



**October 21, 9:15 a.m.**



Another angle on the same process:



I took both butterflies on their stalks outdoors to bask in the warmth of the sun.



**October 21, 10:45 a.m.**

When she opened her wings for the first time, it became clear that the “younger” one was female – heavier-looking veins, and no black spots on the outsides of the wings:





**Female Monarch opening her wings for the first time, 11:45 a.m.**

Both still had an hour of quiet sitting and tentative wing movements yet to do. At 12:40, she flew, and a few minutes later, he followed suit. I was able to follow him as far as the spicebush, where he clearly wanted to be left alone. When I snapped his picture, he flew on into the woods.





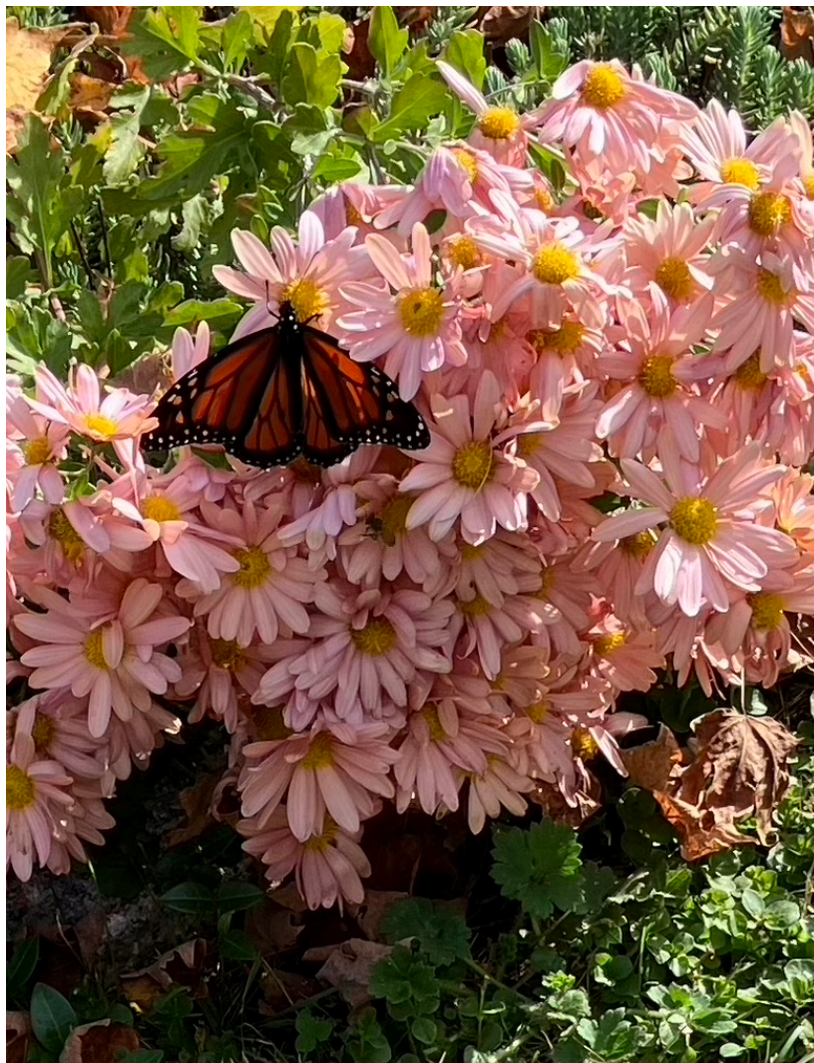
**Male Monarch in spicebush, resting after first flight, 12:45 p.m.**

These two Monarchs have emerged very late in the season. Their chances of making it to Mexico are narrow, but not nil. They will likely stick around in our yard for a couple of days to plump up on nectar before they try to fly south. We've had no frost yet; there still are asters, chrysanthemums, marigolds, nasturtiums, and zinnias blooming in the yard, so there is nourishment close by. Once they're ready, if they can catch a thermal uplift and soar on the October winds from the north,



they can travel south at 30 miles an hour, gliding for hours at a time without needing to refuel.<sup>2</sup> All they have to do is keep ahead of the frost that kills flowers!

This Monarch prince and princess hatched from eggs that were laid by a female Generation 3 Monarch a month ago. They both made it from egg to 5th-instar caterpillar, which only 5% of Monarch larvae do. They made it through pupation – not always a safe passage – and now they’re adults. They’ve experienced flight. I hope they enjoy the nectar in the neighborhood, catch some good weather, good updrafts, and head south soon. Maybe they’ll be lucky enough to be part of the renewal of the circle of Monarch life in 2023.



**Female Monarch on chrysanthemum**

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<sup>2</sup> Anurag Agrawal, *Monarchs and Milkweed*, Princeton University Press, 2017. p. 185.