Cool Cats at the Milkweed Café

In my last post, I mentioned sightings of Monarchs in the Way Station on July 9 and July 18. On July 20, I found a scattering of eggs – looking like tiny pearls to the naked eye – on the undersides of the leaves of one plant in the milkweed stand:



Monarch Eggs, July 20

The eggs are larger white globules on the leaves; the small flat white dots on the leaf vein are bits of oozing milkweed sap.

This was encouraging! The next day, I saw my first Monarch "cats" (caterpillars) of the season:



Monarch Caterpillar, Second Instar, July 21

As you can see, this little cat has munched through the leaf, creating a hole for the sap to ooze out of, leaving the leaf vein depleted of sap, and therefore easier to eat. The cat is very, very tiny compared to the midvein of the milkweed leaf, but it's already in its second instar: you can see tentacles (sensory organs) beginning to "sprout" as black spots just behind the head (lower end of the caterpillar in this photo). If all goes well, it will eat and grow and molt (break out of its skin) again and again and again, until it reaches its fifth instar. There were several more tiny cats on the undersides of other leaves on the same plant.

On the morning of July 25, I saw a number of eggs, a few more second-instar babies, and this really big cat. The front and rear tentacles are recognizable as such. Because it was in motion on the leaf, I think it must have been a fourth- or fifth-instar critter.



Monarch Caterpillar, Fourth or Fifth Instar, July 25

So how long does it take a Monarch to go from egg to fifth instar? About two weeks. It's been just about that long since I got my first report of a Monarch at the Way Station.

Prix Fixe Dining at the Milkweed Café

Each species of wild plant has evolved some way of protecting itself from being eaten to extinction by insects, birds, and animals. Some use mechanical deterrents, like thorns, and many use chemical deterrents.

Common Milkweed (Asclepias syriaca) has a couple of very powerful self-protective tricks:

(1) It produces a thick, latex-like sap that is so sticky, it can gum up the mouthparts of would-be insect predators and thus prevent them from eating more than one bite.



Milkweed sap oozing out of broken leaf attachment points

(2) It produces toxic compounds in every part of the plant, including the sap. These cardenolides, or "cardiac glycosides," are similar to the compounds found in *Digitalis*, used medicinally in tiny doses to treat heart conditions, but toxic in larger doses. The milkweed's cardenolides can cause serious cell damage to anything that ingests them, disrupting biological pumps that control the flow of ions in and out of living cells.¹ They also taste bad.

¹ The cardenolides are soluble in water, so it is considered safe for humans to eat the flower buds after boiling them in water. I've done it, but only once. The results were tasty, but not highly digestible.

So for *most* diners, the *prix fixe* of dinner at the Milkweed Café is death. In fact, most insects, birds, and larger animals avoid the café altogether, whether by instinct or, having nibbled an unappetizing hors d'oeuvre, by experience.

But the Monarch has co-evolved with *Asclepias* species, and at some point in ancient evolutionary history, it developed an alternate cellular pumping system. It's one of the very few insects that can ingest the cardenolides without being poisoned. The Monarchs don't break down the poisons in their digestive process: they secrete them, and thus the later-instar larvae and adult butterflies are themselves poisonous to most would-be predators.

At least few other insects are able to enjoy milkweed in this fashion – one of these is the Red Milkweed Beetle we met last week. This beetle has a trick of biting off the end of a leaf midrib and letting the sap ooze out to protect its mandibles. Chomped leaf ends are good evidence of the beetle's presence. These insects are strictly herbivorous, and tend to coexist peaceably with the Monarch larvae.



Red Milkweed Beetle and Monarch Caterpillar (on lower leaf)

I was just about to leave the Way Station when a super-handsome male Monarch sailed in and landed at the apex of the milkweed plant whose leaves I had just been studying. The Andover Milkweed Café is a happening place.



Male Monarch Butterfly Nectaring on Milkweed Blossoms, July 25

So good luck to all the Generation 3 eggs and cats. May they live and prosper and metamorphose.