

Monarch Chronicles

By

Clyde R. Camp

Note: all of the links and photographs go to my Facebook page or other websites allowing you to click through full-sized versions of the photographs and figures as well as videos relevant to this subject.

[September 12 at 6:04pm](#) ·

I'm going to be a Father !! This adventure started when we noticed two large Monarch caterpillars and one tiny Queen caterpillar on a milkweed has come up annually for the last 4 years in the expansion joint between two slabs of concrete in my driveway. For the first time, this year, butterflies laid eggs on it. By the time we noticed them, they were pretty good sized.

I'd always wanted to follow the progress, but had no idea how to go about it. This was all trial and error with a lot of internet research and tips/help from a fellow Texas Master Naturalist who has become a locally recognized expert on Monarchs in the area, giving presentations and exhibitions all over the place.



[September 14 at 1:05pm](#) ·

Day 2: Getting bigger. Both on the same milkweed now.



[September 14 at 6:00pm](#) ·

Day 3: Green Milkweed buffet

[video at <https://www.facebook.com/clyde.r.camp/videos/10215051525949844/>



[September 15 at 5:17pm](#) ·

Day 4: Holy cow. Kiss that milkweed goodbye.

They are literally devouring the flower head and almost twice as long and thick as they were this time yesterday.

[Video at <https://www.facebook.com/clyde.r.camp/videos/10215060568775909/>]



[September 16 at 12:22am](#) ·

Day 4 - Part 2: Between the last post at about 4pm and two hours later when the top picture below was taken, they had finished off the entire flower-head except for two flowers. An hour later, they were done with those and had moved down to the juicy leaves next to the driveway there the plant is growing.

They keep eating at night and I was afraid they were going to run out before morning so on the advice of a local Monarch expert in our Master Naturalist chapter, I clipped the entire stalk off with them on it and moved it around to the front yard where I have a pretty good sized milkweed that's laying sort of horizontal to the ground.

I laid the old stalk with them still chewing away on it onto the new plant (last two pictures). We'll see how it looks in the morning.

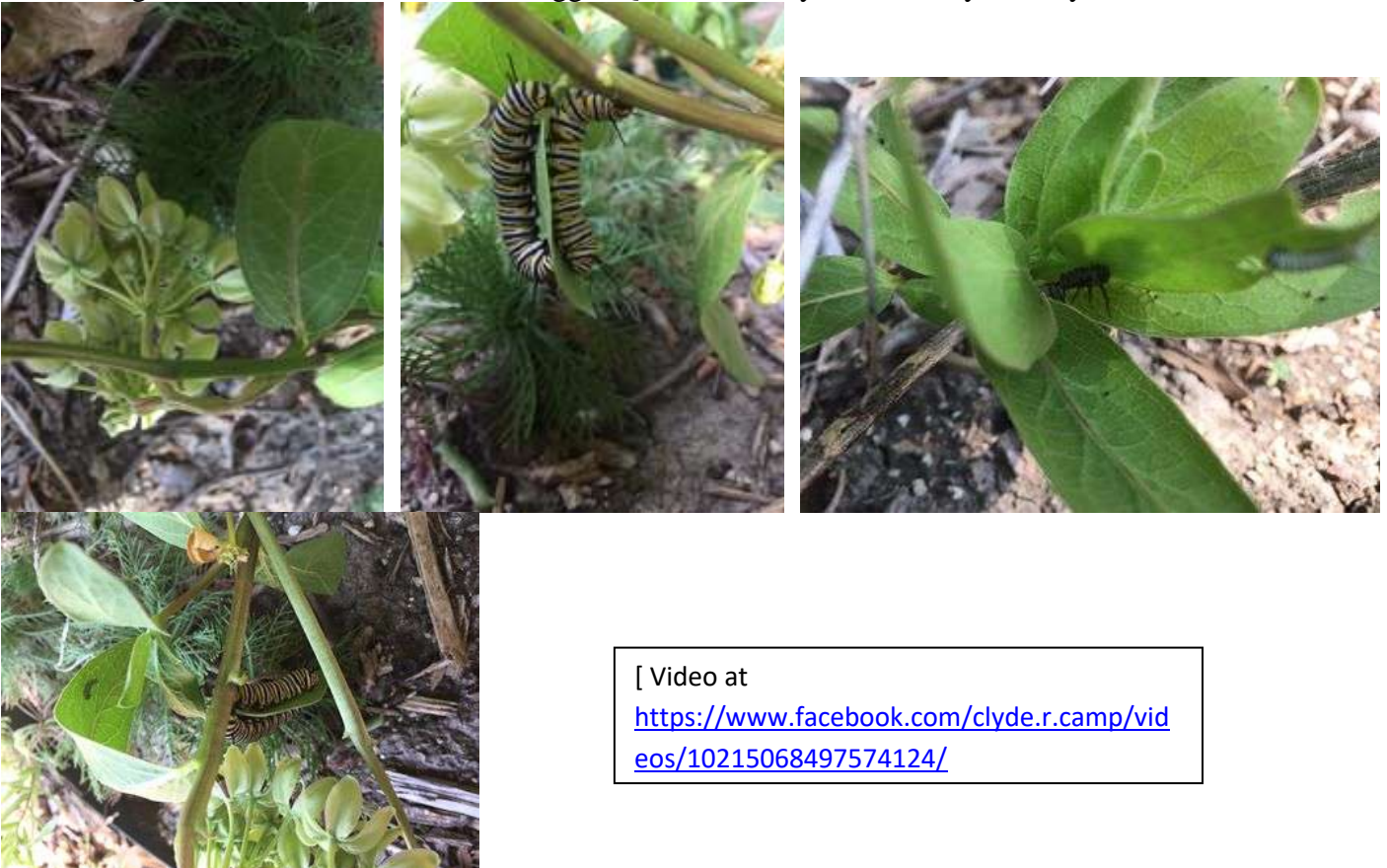
She also pointed me to <https://monarchlab.org/.../b.../breeding-life-cycle/life-cycle/...> which has details on the five larva development stages (called instars). From those descriptions, I think I have one Instar3 and one instar4. So they'll start pupating in the next few days to a week.

As we were moving them, we also found a single first Instar of a Queen Butterfly with three sets of tentacles instead of the Monarch's 2. Way too small to photograph in the twilight.



[September 16 at 11:49am](#) ·

Day 5: overnight, they chewed the stem of the new plant in half so it's drooping down. This morning they are totally motionless on opposite sides of the same leaf. Pretty sure this is the final stage before pupating. On the middle photo on the right you can see a first stage instar on the leaf opposite them. The bottom right photo has a 2nd 1st stage monarch and the now much bigger Queen butterfly larva from yesterday.



[Video at

<https://www.facebook.com/clyde.r.camp/vid/eos/10215068497574124/>

[September 17 at 1:29pm](#) ·

Day 6: A bad day in Larvaville.

Based on their appetites, I took a short car-ride after the last post yesterday to clip a few stems from a center median on an unused road. Just in case they finished off what they were working on.

According to a reliable source, they'll keep for a week or so.

Two hours later, I went out to check to see how they were doing and the two big ones and a couple of the smaller ones were chowing down on the flower-head, making major inroads. Evidently the flowers are much tastier than the leaves.

A check two hours after that revealed that the two big ones were - gone. Just ... gone. Nowhere to be seen around the flowerbed. I found one of them humping along the sidewalk at a good clip about 5 feet away, either looking for another milkweed (there aren't any in the yard) or a good place to pupate. I rescued him and put him in a big jar with a cheesecloth top and a big sprig of refrigerated milkweed. I never found any sign of the 2nd one.

This is Sunday and the sprinklers went off in the front. Of the 3 small Monarch larva and the two Queen larva I found yesterday, there were only two Monarchs today. The others either got blown off by the spray (now turned off) or wandered elsewhere looking for something to eat. They only eat milkweed so if they don't come back, they'll eventually starve.



[September 18 at 2:04am](#) ·

Day 7: HighSchool Graduation

Sometime between 10pm and midnight Sunday night, he stopped eating, fastened himself to the bottom of a leaf, hung down and started building his/her chrysalis. I had to cut away some of the surrounding leaves to get a clear view of him. Or her.

I say building his chrysalis, but that's not right. It is not a cocoon - it is actually what's left of it's body when it sheds its last caterpillar instar. By morning, maybe sooner, all of the striped skin, tentacles and head will have been shed in a little bundle and the chrysalis will be compacted into a squat shiny green capsule instead of another, larger caterpillar.

All internal organs, muscles, will have been reduced to undifferentiated cellular mush, sort of analogous to stem cells and over the next 10-14 days all that mush will be reconstructed into an adult butterfly.

I have no idea how long the chrysalis will take to form in real time, but there's a good time-lapse youtube video at https://www.youtube.com/watch?v=-gsm_ZyJz_s taken by someone else.

When it's done, I'll move it to another container where I have a better view of it. It's perfectly fine to do this as long as I don't damage the leaf attachment and keep it hanging how it's hanging now.

I'm lucky to have gotten this. As I read up on each stage, I found several references that it's not uncommon to find the Chrysalis up to ****30 feet**** from where the last meal was. Caterpillar #2 could be anywhere in a 2800 square foot circle from the flowerbed. I'll look tomorrow, but hold no hope.

Evidently, this is for protection. A chrysalis hanging from a bare stripped plant could be quite a delicacy.



[September 18 at 12:58pm](#) ·

Day 7: Bingo - missed it.

This morning at 10:00 he looked just like he did last night. Hanging from a leaf and curled up slightly. Wiggled a little if I moved the jar, but otherwise the same.

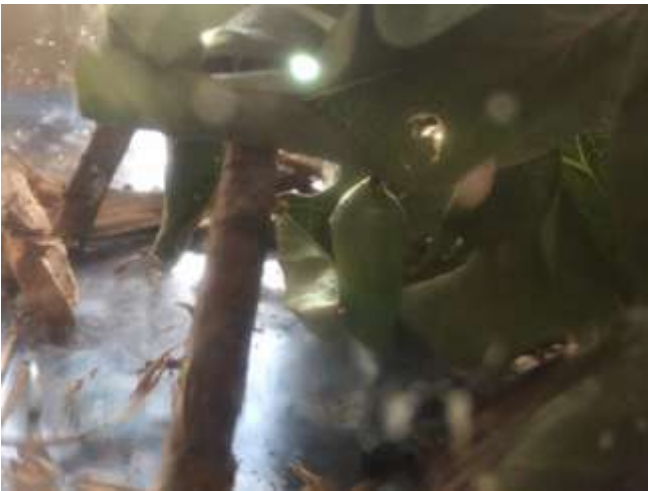
I went to the dentist at 10:30 and got back home just now at 12:30 to find it was all over. Some time in those 2 hours he went from a caterpillar to chrysalis.

Multiple websites indicate that when the transformation begins, it only takes 10-15 minutes from start to finish. And I missed it. Bummer.

A day by day x-ray of what's going on inside can be found at <https://m.youtube.com/watch?v=SoMs5czRo14> - this is not a Monarch chrysalis but the same building process will be happening over the next two weeks.

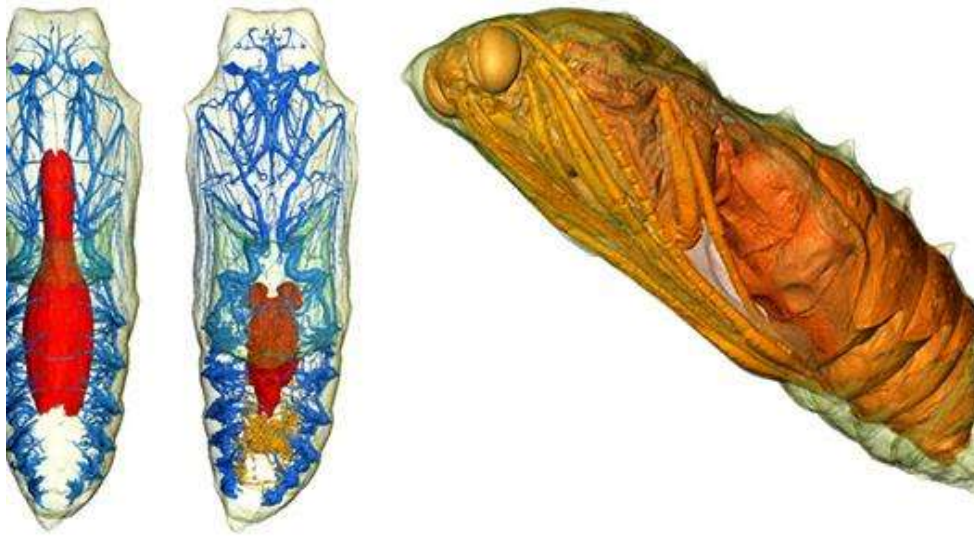
As Carol Clark observed in my last post on this, some structure is there and evident inside even on day 1 - it's not all mush.

"Carol Leonardi Clark The "turns to mush and rearranges" thing is now outdated teaching. It's been persistent. I have read it here and there, but Chip Taylor of Monarch Watch says it's not true. They have actually got a lot of their adult features in place and fairly well formed by the time they shed that last skin."



[September 18 at 1:29pm](#) · So what's going on inside that chrysalis?

This link has a pretty good description and CT-images that are more obvious than the x-ray.



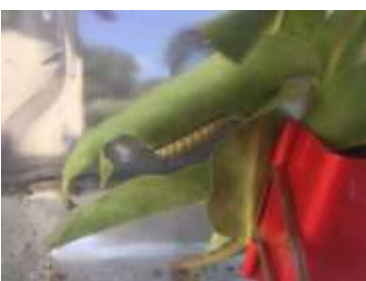
[Click on image for article.](#)

[3-D Scans Reveal Caterpillars Turning Into Butterflies](#)

The transformation from caterpillar to butterfly is one of the most exquisite in the natural world. Within the chrysalis, an inching, cylindrical eating machine remakes itself into a beautiful flyi...
phenomena.nationalgeographic.com

[September 19 at 2:57pm](#) · Day 8: Waiting

I moved the chrysalis ... Now named Bob ... out of the jar and taped it by its original leaf to a lamp shade near a north window. The jar was emptied of old leaves from Bob's tenure, refurbished with a fresh sprig. Two new tenants have moved in ... Sally (in the leaf tunnel) and Tom (laid out under a large leaf). Both Monarch larvae, with Tom a few days older. They will be about ready to pupate when Bob is emerging as an adult. If, that is, they are not vaporized by WWIIII after Trump's UN speech. The audience looks mostly contemptuous, aghast or bored.



[September 19 at 4:16pm](#) · Day 0: Filling in the gaps [Note: none of the following photos are mine.]

A Monarch egg is about 1mm high and takes 4-5 days to hatch. It is white or pale yellow at the beginning and just before hatching gets darker at the top as the large black eyes develop.

The caterpillar that emerges from the egg is the 1st stage (or 1st instar). His first meal is his own egg case. The first 10 minutes of the caterpillar's life is shown in the following video

<https://www.youtube.com/watch?v=9H1Rd2Ya30k>

He will eat, grow and molt 4 times over the next 10-14 days, each time becoming bigger and eating (much) more to get to the next stage. But a 5th molt results in a chrysalis instead of a larger 6th instar caterpillar.

The ones I've been finding are in their 2nd instar (Sally) or 3rd instar (Tom) which makes them way big enough to be seen and noticed by a casual glance.

Bob, of course, has graduated to a fine green chrysalis with a gold spotted diadem. He will be mostly immobile in the Chrysalis until he's ready to emerge in another 10-14 days.

The gold coloration is partially pigment and partially a structural filter as explained in

<https://askentomologists.com/2016/12/08/striking-gold/>



[September 20 at 11:08am](#) ·

Day 9: The vigil continues as it will for the next week and a half or so.

Tom (in the foreground) and Sally (in the background) are noticeably larger but I think the same instar stage as yesterday (Instar3 for Tom and 2 for Sally). I changed their food supply today. I've noticed that the refrigerated leaves do, in fact, stay fresh and plump in the fridge, but once removed begin to start drying out and getting rubbery. I don't think the caterpillars care as long as the leaves aren't actually crispy or crackling. For all I know, they wouldn't care then either.

But I keep thinking about Bob and siblings *preferentially* going after those nice juicy flowers.

Both of them are head down - they seem to prefer that feeding position. Although it might be coincidence in when I take the pictures, maybe it's also a precursor to their hanging upside down when they pupate.

They only have 6 legs although it might look like eight. The three pair of real legs are hard, pointy, inconspicuous and up under the head/thorax at the very front of the caterpillar. These don't dissolve when they pupate.

Then there are the more obvious four pair of stumpy *prolegs* that are sort of like suction-cups with another pair on his rear end. These let him hang onto almost anything and rear up the forepart of his body to move to or eat stuff above them as the next photo (not a Monarch caterpillar) shows. The prolegs do dissolve during pupation.

There are all kinds of insect larva eating stuff out there and all insects have this larval stage although the number of prolegs and legs differ on a species by species basis. Some, like fly maggots, have no legs of any kind. I found a nifty binary tree chart that lets you look at a larva of any type and based on the legs determine the general class of insect that it's going to become.

[begin: geek-talk]

Complete metamorphosis insects are clumped together under the term *holometabolous* and include beetles, June bugs, mosquitoes, flies, moths, etc. and have four stages - egg-larva-pupa-imago (imago is the term used for a sexually mature adult).

Incomplete metamorphosis insects are clumped together under the term *hemimetabolous*, skip the pupa stage having a life cycle of egg-larva-imago The larva is often referred to as a nymph. These insects include roaches, dragonflies, mantises or grasshoppers.

Incidentally, I've been using the term "pupa" interchangeably with "chrysalis" which is no problem with butterflies. Pupa is the third development stage, between larva and adult, of complete metamorphosis insects. A chrysalis is the form that the pupa takes for butterflies. Other insects have different forms - like a cocoon for moths. In short, all chrysalises are pupa but not all pupa are chrysalises.

The same goes for larva vs caterpillar. Caterpillars are the larval stage of moths and butterflies. Other insects have other forms. All caterpillars are larva but not all larva are caterpillars.

[end geek-talk]

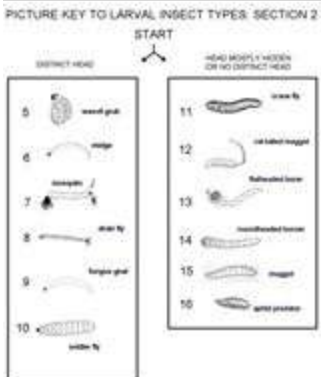
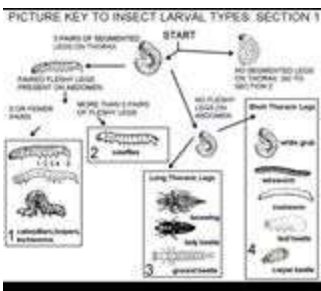
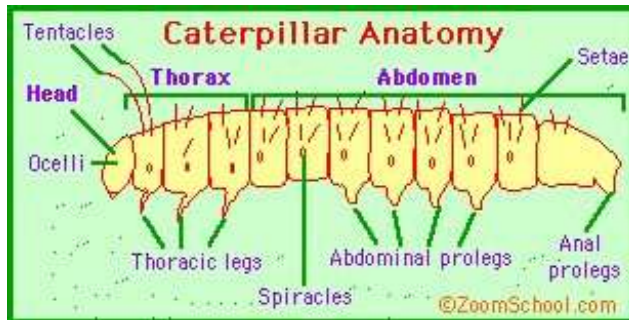
Bob is still just hanging around but, probably like the proverbial duck that is "Calm on the outside but paddling like Hell below the water", things are very much happening inside. Having a pupa stage supposedly gives

insects a significant survival advantage as the adults and larvae, being different, do not compete for the same food sources and have different predators.

If you enlarge the chrysalis photo, there are two things that stand out aside from the gold spotted 'diadem' - almost the defining characteristic of Monarch pupa.

First is the obvious outline of what will be the wings on the right side. This won't *become* the wing, but the wing will form directly beneath it. The chrysalis itself is transparent like cellophane - the color (except for the gold spots) comes from what's inside. As the pupa matures, it will darken from this initial translucent green and in the last few days the adult-to-be, especially the wings, will be visible inside.

Second is what appears to be Arabic or Sanskrit writing just above the lower two gold dots. I have *absolutely* no idea what that's about. Most likely it's an individual oddity for this particular chrysalis (unless there's a geni inside).



[September 22 at 1:55am](#) ·

Day 10: Waiting

Tom and Sally have a new buddy - Irma - who joined them Thursday morning from the front yard. I had noticed that chunks of milkweed in the front yard had been disappearing but hadn't been able to find the culprit until now.

Sally is still the smallest, but Irma is as big as Tom.

All three are munching away now after taking a break so long yesterday that I was wondering if they were sick, dying or dead. Hardly any movement for almost 20 hours.

I spritzed them and the leaves with water about 6pm tonight, put them outside where it was warmer, and then we went to see the play *Miller, Mississippi* (good acting but man!what a downer). We got back at 11 and what a difference.

Don't know if it was the water or being outside or they just decided to eat but when we got back all three were up high on the leaves and moving.

An hour later (now), and they have stripped the one stem they had been mulling over all day completely bare so I put another one in for the remainder of the night.

Top picture is Tom - he stayed frozen in this position for at least two hours. Then Irma on the left and Sally on the right.

Tomorrow (later this early a.m.), I'll be picking up 7 eggs to watch them develop and hatch and get a small aquarium to replace the wide-mouth plastic jar I've been using. the camera doesn't like focusing through the plastic at some places which is why the dull/fuzzy photos sometimes.

Bob the chrysalis is still hanging around.

I have a good stereo inspection scope and a professional binocular medical microscope and have ordered an eyepiece camera in the hopes I can take my own movie of an egg hatching.



[September 22 at 6:57pm](#) ·

Day 11: Still waiting while everybody chows down – 5 new eggs to hatch.



Video at <https://www.facebook.com/clyde.r.camp/videos/10215126884953772/>



[September 23 at 11:09pm](#) ·

Day 12:

Don't know what happened to the text for Day 11, but the big blue thing is the nifty collapsible Monarch Rearing Enclosure which is sold by Walmart under the name of "Meshy-bag Dirty Clothes Hamper." I picked up this one on loan from a friend who also gave me seven eggs - each attached to a little leaf.

But, today, a day later, I don't think they made it. The leaves are all dried up and I'm not seeing any nibbling on them. You can see an egg in the middle of the leaf on the 1st photo below and two new hatchlings on the leaf behind - they were already there when I unpacked the egg container. They're probably two days old. Magnified views of both are also in this post. You can see 3 of it's feet and the two large bumps will become its head-end filaments or tentacles. I'm told that Filaments is probably a better word. The camera/magnification is way too hi for this size project and I don't have the correct lighting attachment. The bright yellow egg photo was taken last year of a Gulf Fritillary egg on a Passion flower vine - I watched her lay this one. Never saw what came out of it though.

Tom or Irma (Sally is still identifiable as the smaller of the three) went wandering all around the enclosure last night, then back to the stem to eat today and then tonight has finalized what I'm guessing will be its pupation location (now there's a term) on the mesh at the top of the enclosure. The other two should do the same tomorrow or Monday.

If they follow Bob's sequence, sometime tonight or tomorrow morning they'll swing head down in a J-shape. Then hang like that for 18 hours or so before shedding their skin revealing the chrysalis beneath.

Bob's still hanging on the lampshade with no noticeable change but it's only been 5 days and he still has a dozen or so days to go.



[September 24 at 10:26am](#) ·

Day 13: Stuff happening

About 10pm last night, about 4 hours after settling down in the top of the tent, caterpillar #2 (aka Tom - I'm not naming them any more) fastened his rear end to the mesh and became immobile. Three hours later he woke up and started letting loose with his front feet. LOTS of wiggling, weaving back and forth and curling up.

From the position he was in, I couldn't take a video, but I found one on the web that is the same thing.

<https://m.youtube.com/watch?v=8ViRYSHGUaQ>

It's a pretty good video and explains the whole process. I didn't realize the silk was produced in his mouth to make the pad he plants his butt in.

He was well finished and hanging in a J shape when I got up this morning. He'll stay this way for the next 18 hours and then shed his skin and become chrysalis#2.

Also this morning, caterpillar #3 (aka Irma - ditto)) has begun the same process by climbing to a stick in the top of the tent and going immobile. Probably finish tonight.

Caterpillar #4, previously known as Sally and the noticeably smallest of the three, is checking out a new sprig of milkweed. Her grub was OK when I went to bed about 3am, but this morning it was a dried up inedible thing.

Video at <https://www.facebook.com/clyde.r.camp/videos/10215143679133616/>

Bob is unchanged.

No activity on the eggs.



[September 25 at 11:21am](#) ·

Day 14: Two J's and a Death?

Caterpillars #3 and #4 (Sally and Irma) have now hung themselves up as a J, initially very tight at 2am, but now much looser. This is how Tom started out but I hope they do better than he's doing. #3 is hanging from the mesh and #4 from a branch. If all goes well, I'm hoping for chrysalis by midnight.

But poor Tom, #2, is badly 'dented' and appears to have gotten tangled up in a strand of his own silk (the raggedy white line going between him and the meshy-bag in the last photo and is well past the 18 hours. I'm afraid he's dead. But I'll wait till the others pupate just to make sure. Then a post-mortem.



[This was actually early yesterday morning - I forgot to post it]

Day 15: CRAP CRAP CRAP DAMN DAMN DAMN !!!!!

Sally and Irma are hanging vertical now and dead or dying.

But I am vastly relieved that three caterpillar deaths were not something I did!

What happened to Tom is now happening to the other two caterpillars (Irma and Sally) tonight - both gone from a fat healthy J initially to just hanging straight and getting noticeably thinner and limper.

Evidently a parasitic fly called a *tachinid fly* got to all three caterpillars and laid eggs ****IN**** them before I even brought them inside. Or the egg itself could have been infected - there appears to be some controversy as to whether or not that happens.

I've collected 3 brown fly pupa (the definitive evidence - probably emerged from Tom) in the bottom of the tent and am watching for others to show up. They're all in a jar to contain the eventual flies as they emerge in a few days. I've also put the three caterpillars in the same jar to contain any new larva (maggots) as they come out.

After at least one pupa hatches so I can see what the fly looks like, I'll pickle the lot of them - caterpillar, pupa, flies, everything - just to make sure they are damned DEAD!

Nature is freaking ugly at times. At least (knock on wood) Bob the Chrysalis is apparently not affected and seems to be OK so far. Otherwise he'd be showing some deformity and discoloration by this time.

According to the article at <http://www.cranialborborygmus.com/tachinid-flies-are-killin...>, the infection occurs in the wild and by the time I found them outside, the damage was already done.

As bad as this is (for the caterpillars), at least it's not a fungus or bacterial infection which would require some sort of sterilization of the tent. Or, for \$10, buying a new one.

The fly larva and pupa are not teeny tiny (photo of pupa and poor Sally below) and are relatively easily found after I emptied out the tent. The fly pupa take 5-7 days to mature and I'll be checking daily to see what happens and catch the little bastards if any more show up. I've not found any maggots, so hopefully the infestation is now contained in the jar.

Addendum: About an hour after I isolated the three caterpillars and 3 fly pupa in the jar, the disgusting maggot in the last little video crawled out of Irma's corpse.

video at <https://www.facebook.com/clyde.r.camp/videos/10215157620682146/>

Seeing the size of these pupa compared to the caterpillars, it's no wonder that Tom, Sally and Irma seemed so much smaller than Bob when they hung themselves up to pupate. They were being eaten alive.

The fly larvae don't kill the host caterpillar until it pupates (Hey, you don't kill your own food!) But depending on when the caterpillar is infected, the fly larva could end up in the pupa, with the same deadly result.

A rather disgusting video of the maggot escaping from a now-dead Monarch caterpillar is at <https://www.youtube.com/watch?v=p0Hq7IH0lxQ>.

What I thought was a silk string on Tom is actually the dried mucus trail from the fly maggot as it lowers itself down.

If there are still no additional pupa in the tent by Tuesday, I'll start over with new monarch eggs if I can get some. The article indicates the eggs do not undergo predation by the flies - possibly because the eggs are so small.

Of the 7 eggs Carol gave me, there is only one caterpillar munching on a leaf. None of the others made it. I had laid the tiny egg-containing leaves on a healthy stem, but the egg-leaves dried up awful fast. Next time I'll cut the segment holding the egg or stage1 caterpillar into a much smaller piece and lay *it* on the healthy leaf.

In the meantime the stage1 is outside of the tent but in the house and appears to be doing OK, munching its leaf, but is so small it's hard to tell. I'll see if it's moved tomorrow.

Damn parasites.



(image 1) dead hanging monarch caterpillar that failed to turn into a chrysalis. Instead, tachinid fly larvae killed it and then emerged and dropped down. Note the tell-tail dangling clear white strings where the larvae emerged. If you find this, your caterpillar was killed by tachinid flies.



(image 4) tachinid fly pupae next to dead monarch caterpillars. Two caterpillars produced thirteen (13) tachinid fly pupae.



[September 27 at 11:04am](#) ·

Day 16: No eggs but new caterpillars.

The single teeny tiny from-egg caterpillar that I have left from the 7 eggs I got last week is now large enough to tell that it's a Queen butterfly larva and not a Monarch. The three sets of filaments are clearly visible. For reference, it's about 3/16-inch long.

It will be named *Queenie* for obvious reasons, even though I said I wasn't going to name them any longer.

I picked up 5 new 1st stage Monarch caterpillars this morning and put them on the same plant as Queenie - one per leaf. They are all visible in the 2nd photo and about twice as big as Queenie, who is out of sight on the leaf that has two holes eaten in it.

The maggot in the Day 15 video has turned into the 4th fly pupa. They are all sealed up in a jar until the 1st one hatches, then they will be pickled and tossed.

Bob the chrysalis has lost the translucent lime green coloration and is now dusky green and definitely not translucent. Hopefully this is just the normal progression to butterfly and he hasn't got a parasite issue. The indentation in the lower right is where the Sanskrit writing is.



[September 28 at noon](#) · Day 17: Lift Off

From the dusky chrysalis yesterday morning to a final butterfly about noon-thirty today.

I missed the actual emergence while I was on a 15-20 minute phone call. I thought it would take longer than it did. The linked photos are captioned with what is going on at each step. At noon, he'd been out for about an hour and a half.).

Incidentally, I guessed right on the name - Bob is in fact male as identified by the wing markings (thin-ish veins and black spots on the hind wing in the comparison image

In the larva/caterpillar stage, sex can only be determined by dissection, a steady hand and a microscope. The caterpillar does not survive this. For the chrysalis stage, the directions are:

" Surrounding the cremaster (the structure from which the pupa hangs) are a series of rings, called abdominal sternites. Within the first ring (9th abdominal sternite) are several paired black dots next to the cremaster; turn the pupa so that you are looking at these dots. If the monarch is a female, the ring adjacent to the 9th sternite will have a line dissecting it; this line (indicated by the arrows on the photo and diagram below) will be centered between the pairs of dots. Male monarch pupae do not have this line."

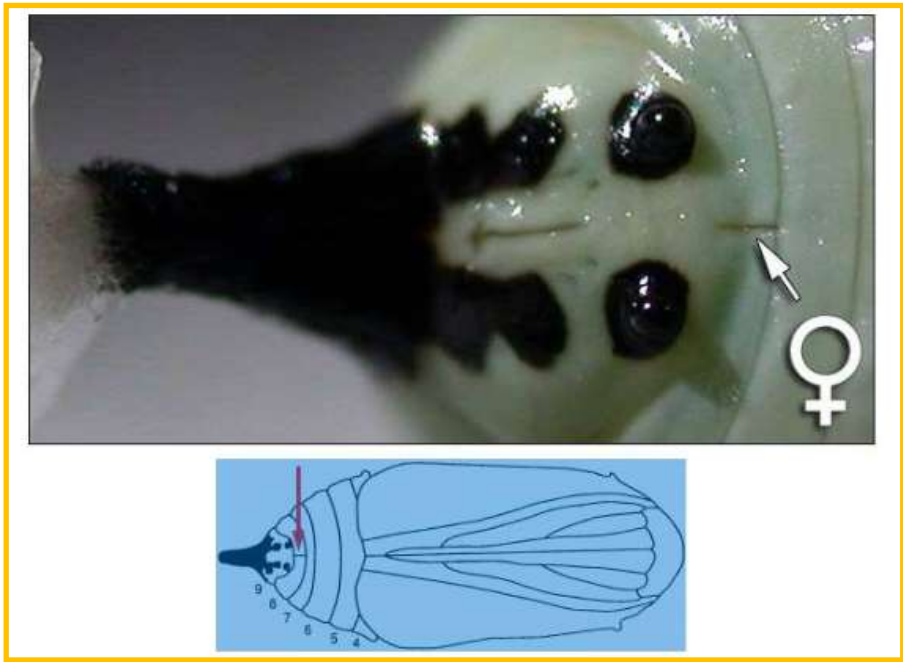
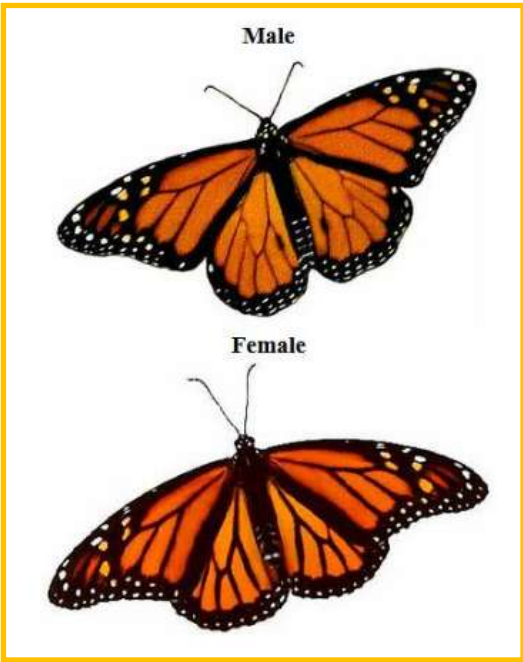
[see the microphotograph/diagram image]

Queenie is still around, growing slower than compared to her Monarch cousins. She seems to prefer hanging around on the underside, I've never seen her on the topside of the leaf.

The Monarch cousins appear to have lost one. I can only see four in the last image - two are noticeably larger, one smaller and one noticeably smaller. I'm guessing they came out of the eggs a day apart. All are chowing down. Captioned versions of these images can be found [here](#) explaining what you see.







Day 17: Summary & Coda

Seventeen days ago I started with Bob as an instar and ended with him flying away today. This post finishes this particular saga but I'll keep posting photos of the new batch of caterpillars as they develop (hopefully without parasites.)

I thought Bob was an Instar2 when I first plucked him off the milkweed in the driveway. But working backwards from his known first day a butterfly and then first day as a chrysalis and then using average spans for each stage, the chart below shows he must actually have been a late Instar3 or early Instar4 after being laid as an egg around September 2nd. Lots of variables but the timing pretty much fits.

Bob eclosed (a relatively recent word relating to insects, meaning to emerge as an adult from the pupa or as a larva from the egg. Sort of the opposite to *en*close) around 11:00 today (see previous post) and at 2pm was gone. At least 2pm was when I went out to see how he was doing and found him ... nowhere.

Presumably, unless a gecko popped out and ate him off the wreath, he finished drying out and flew away, looking for his first of many nectar meals and possibly a good looking female. He will probably be heading down to Mexico where he'll spend the winter with his brethren before mating in the spring.

The video at <https://www.youtube.com/watch?v=RFoSpaNqqeQ> talks about the 3-5 generation migration north in the spring, the single generation flight back and the loss of habitat for various reasons that is endangering the species. Another Migration video is at <https://www.youtube.com/watch?v=kHby5DmmOUY> And recap of a multi generation migration cycle is at <https://www.youtube.com/watch?v=QpffQtKN-gk>.

Remember that it takes 3-5 of these 3-5 week generations to get from Mexico to Canada for the summer. But that Canadian generation, in late August, hatches out, pupates, ecloses and flies 3000 miles back to central Mexico where their original Great-great-grandparent, long dead, came from.

This generation is sometimes called the Methuselah generation, because it lives long enough to fly back to Mexico from as far as Canada, winter over there, wake up, mate and fly north to Texas where females lay 200-400 eggs and then die. So instead of a normal lifetime of about 3-5 weeks, they can live for as long as 6-9 months (late August-ish to May-ish).

Amazingly, this migration cycle was *unknown* until 1975 when Dr. Fred Urquhart, almost by accident, finally fleshed out the final details to a mystery that he'd worked on for for almost 50 years.

<http://www.flightofthebutterflies.com/discovery-story/> talks about this and you can watch the complete movie on youtube for about 3 bucks at https://www.youtube.com/watch?v=-bHGtKN4_AE. It's worth it. Prior to Dr. Urquhart's discovery, people in the U.S. wondered where the Monarchs went in the winter - in Mexico, they wondered where they went in the summer.

My understanding is that mating is suppressed during the southern migration, so where did my original caterpillars come from? Maybe recent changing weather patterns have upset things. Bob may not make it all the way back to Mexico if we get a sudden cold snap. But he might. I wish him luck.

Stage	start	Avg Time	End
egg	2-Sep	4	6-Sep
1st Instar	6-Sep	2	8-Sep
2nd Instar	8-Sep	2	10-Sep
3rd Instar	10-Sep	2	12-Sep
4th Instar	12-Sep	2	15-Sep
5th Instar	14-Sep	4	18-Sep
Chrysalis	18-Sep	12	28-Sep

Green=Actual start/end dates