

# The Outside Story

## Chrysalis Surprise: A Parasitoid Wasp

By Rachel Sargent Mirus

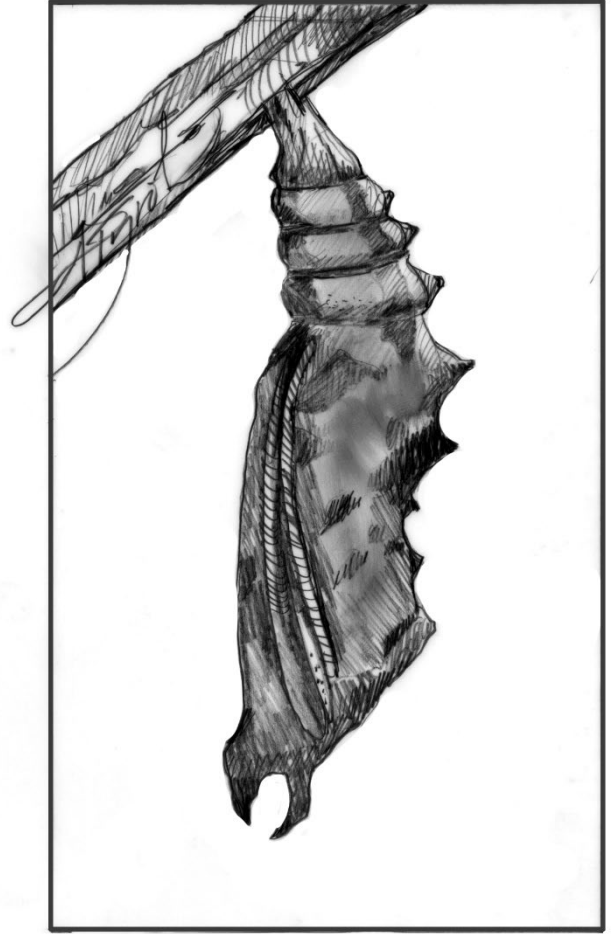
A caterpillar eats and eats, becomes a chrysalis, and after a period of metamorphosis emerges as a beautiful butterfly! Except, sometimes... it doesn't quite work that way.

Occasionally, while sitting on my deck, I spot smallish, orange butterflies landing on our hop plants. Their upper wings, about two inches across, are bright orange with dark blotches and eyespots, but camouflage brown on their underside. These are eastern comma butterflies (*Polygonia comma*), named for a silvery marking on the hind wing. If I look closely after one has flapped away, I can find one or two tiny, peridot eggs that it left behind on a hop leaf.

I first encountered the eastern comma as a caterpillar two summers after we planted the hops. The caterpillars I saw were mostly dark-bodied – although there is color variation among this species – and had pale, irregular stripes. The caterpillars also sport spiky, branching spines, which help to deter predators. That summer, I found caterpillars on nearly every leaf I checked, from tiny, newly hatched ones to later-instar caterpillars ready to pupate. I brought a few of them inside and kept them in jars to watch them grow, regularly supplying them with fresh hop leaves.

By late August, I had time-lapse videos of several caterpillars shedding their skins to become inconspicuous brown chrysalises. They hung from sticks I'd placed in the jars. By September, I was finding similar chrysalises all over the deck, hanging from railings and planters. I waited patiently, watching the chrysalises and checking the jars on the living room windowsill daily. After about a week, butterflies emerged from some of the jarred chrysalises. One chrysalis, however, unexpectedly produced a black wasp with dark wings.

The wasp was an ichneumonid, a member of a large family of parasitoid wasps. Parasitoids have a lifestyle halfway between a parasite and a predator. A female parasitoid wasp lays its eggs within the early life stages of another insect, such as the eggs or caterpillars of butterflies. The parasitoid's eggs quietly hatch into larvae that develop within the caterpillar as it gets fatter and fatter, but eventually the ichneumonids go through their own metamorphosis, almost always consuming and killing the host caterpillar by the time they're done.



Ichneumonid wasps are many and diverse, so I contacted Sloan Tomlinson, a parasitoid wasp expert, to learn more. While these insects come in a huge range of sizes and shapes, they tend to be slender and generically wasp-shaped, with an abdomen longer than the combined length of their head and thorax. Many are between a tenth of an inch to an inch and a half in length and have understated colors, so they can be easy to overlook. The smallest known adult insect is a parasitoid wasp, from the “fairy wasp” family Mymaridae, and is smaller than some bacteria.

Even though humans pay them little attention, parasitoid wasps can be a boon to gardeners, since they often prey on plant pests. For example, the voracious tomato and tobacco hornworms are hosts to the North American parasitoid wasp *Cotesia congregata* (family Braconidae), which kills these destructive caterpillars.

Tomlinson was confident the wasp I found belonged to the Ichneumonini tribe, a difficult group to identify because there are so many of them and they often look similar. It was most likely in the genus *Coelichneumon* or the genus *Pterocormus*. The second group includes known parasitoids of *Polygonia* butterflies.

I noticed that the empty chrysalises that had produced butterflies were different from the one that produced the wasp. When a butterfly emerged from a chrysalis, the chrysalis opened neatly along a hidden seam, and the remnants were delicate, skin-thin, and translucent. The chrysalis that had produced a wasp had been sawn off in a complete circle around the “head” and was thick and tough.

I toured my deck, collecting the empty shells into two piles: delicate versus tough-skinned. Of these two-dozen chrysalises, most were thick and had their heads sawed off, presumably yielding more parasitoid wasps. I made a rough calculation that suggested at least two thirds of the chrysalises had ended with the emergence of wasps instead of butterflies.

I’ve always enjoyed collecting chrysalises, wondering about the mysterious processes happening inside, and waiting for the occupants to come out. How much more mysterious when the options include a parasitoid wasp?

*Rachel Sargent Mirus lives in Duxbury, Vermont. Illustration by Adelaide Murphy Tyrol. The Outside Story is assigned and edited by Northern Woodlands magazine and sponsored by the Wellborn Ecology Fund of the New Hampshire Charitable Foundation: [www.nhcf.org](http://www.nhcf.org).*

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