The Sneaky Life of the World’s Most Mysterious Plant

It looks so ordinary, this vine. But it’s not. It is, arguably, the most mysteriously talented, most surprising plant in the world.

Photograph Courtesy of Ernesto Gianoli
It’s called *Boquila trifoliolata*, and it lives in the temperate rain forests of Chile and Argentina. It does what most vines do—it crawls across the forest floor, spirals up, and hangs onto host plants. Nothing unusual about that.

But one day a few years ago, Ernesto Gianoli, a plant scientist, came upon a *Boquila trifoliolata* while walking with a student in the Chilean woods. They stopped, looked, and “then it happened,” Gianoli says. On the forest floor, they could see that the vine’s leaves looked like this, kind of stumpy and roundish:

But once the vine climbed up onto a host tree, its leaves changed shape. Now they looked like this—much longer and narrower:
Both leaves came off of the same vine, but when the vine changed hosts, its newer, longer leaves matched its new surroundings. In Gianoli’s photograph below, the vine leaves are marked “V” and the tree leaves “T,” for “tree.” As you can see, it’s hard to tell them apart.

It’s almost as if the plant is camouflaging itself, changing shape to resemble its host.

As Gianoli walked along, he kept an eye out for Boquila vines climbing through the forest, grabbing onto tree after bush after tree, and it happened again! What he saw he found “astonishing.”
In this photo, the vine is on a different tree, and this time the tree’s leaves (marked “T”) are rounder, more like flower petals. And the vine (the leaf marked “V”)? Its leaves are now roundish too!

Woody Allen once made a film called *Zelig*, about a guy who takes on the characteristics of whomever he’s standing next to. The more Gianoli looked, the more Zelig-like this vine became, morphing over and over to look like one different host after another.

As my blog-buddy Ed Yong described it in 2014, when he wrote about this same plant, it has all kinds of moves: “Its versatile leaves can change their size, shape, color, orientation, even the vein patterns to match the surrounding foliage.”

On this tree, for instance …

Photograph Courtesy of Ernesto Gianoli
the tree leaf is jagged-edged, like a saw blade. (We’ve marked it with a “T.”) Our vine tries to create a zig-zag border (see the leaf marked “V”) and sort of pulls it off. Here’s a case, said Gianoli to Yong, “where Boquila ‘did her best’ and attained some resemblance but did not really meet the goal.”

Good try, though. It’s a crafty little vegetable.

**But Why? How Does Mimicry Help This Vine?**

The probable answer is that it keeps it from being eaten. The forest is full of leaf-eaters. Imagine a hungry caterpillar wandering up to a tree:

It loves eating leaves. It might find vine leaves extra tasty. But if our vine is hiding among the many, many leaves of the tree, each vine leaf has a smaller chance of being chewed on. Or maybe the vine is assuming the shape of leaves that are toxic to the caterpillar. This is called Batesian mimicry, when a harmless species tries to look like a very bad meal. Whatever the reason, mimicry seems to work. Gianoli and his co-author, Fernando Carrasco-Urra, reported that when the vine is mimicking its neighbors higher up, it gets chewed on less. On the ground, it gets eaten more. But what’s really intriguing about this vine is how it does what it does: It’s been called the “stealth vine” because, like the classified American spy plane, its inner workings are still a secret.
Learning Its Secret…

No plant known to science has been able to mimic a variety of neighbors. There are some—orchids for example—that can copy other flowers, but their range is limited to one or two types. *Boquila* feels more like a cuttlefish or an octopus; it can morph into at least eight basic shapes. When it glides up a bush or tree that it’s never encountered before, it can still mimic what’s near.

And that’s the wildest part: It doesn’t have to touch what it copies. It only has to be nearby. Most mimicry in the animal kingdom involves physical contact. But this plant can hang—literally hang—alongside a host tree, with empty space between it and its model, and, with no eyes, nose, mouth, or brain, it can “see” its neighbor and copy what it has “seen.”

**How Does It Do This?**

Gianoli and Carrasco-Urra think perhaps something is going on in the space between the two plants. They imagine that the bush or tree may be emitting airborne chemicals (volatiles) that drift across, like so …

… and can be sensed by the vine. How the vine translates chemicals into shapes and then into self-sculpture nobody knows. The signal could be written in light, in scents, or perhaps in a form of gene transfer. It’s a mystery.
“It’s hard for us to grasp that there are … ‘scents’ that we cannot smell, but which plants, noseless and brainless, can,” writes science journalist Richard Mabey in his new book *The Cabaret of Plants*. It’s against the rules to call a plant “smart” the way we might call a dolphin smart; brainless beings aren’t properly called intelligent. Intellect, we like to think, requires a nervous system like our own, which is an animal thing, except that, as Mabey writes, “[I]n being able to cope with unfamiliar situations, [this vine] is demonstrating the first principle of intelligence.”

Hmmm. A knock, knock, knocking on the animal kingdom’s door? Or do plants have their own secret ways of reckoning, totally unknown to us? If *Boquila* can do this, surely there are others. This little vine is sitting on a gigantic secret. I can’t wait to find out what it’s doing, because whatever it is, it’s whispering that plants are far more talented than we’d ever imagined.