



A Tangled Web

In the search for a long-lost spider linked to Charles Darwin, GW biologists discover this

BY DANNY FREEDMAN

There wasn't much to go on: a hundred words or so jotted in Charles Darwin's field notes and a formal description published a few years later. No specimen, no sketches.

But the sleuthing of two GW researchers during a recent journey to Brazil has ended more than 150 years of mystery surrounding the identity of the only spider to be named by Mr. Darwin. And their findings have cleared the way for scientists to begin sorting out a cluttered branch on the tree of life.

The kicker? The answer to this spider stumper had been under the nose of science the whole time. "That was a

surprise," says Gustavo Hormiga, GW's Ruth Weintraub Professor of Biology. "It's a little bit like a detective story, right?"

Mr. Darwin had collected the spider near Rio de Janeiro in May 1832, during his famous voyage aboard the *H.M.S. Beagle*. It appeared to be a new species, but also one that wouldn't fit inside any established group of species, or genus. Mr. Darwin proposed the name *Leucauge* for the new genus and in his notes briefly described the spider's features: the shape of its web, the varying lengths of its eight legs, an abdomen that was "oblong, brilliant; the red like a ruby with a bright light behind."

At some point, though, that model spider was lost; the particulars of how and when now long gone with it.

It's an unfortunate twist though not terribly surprising, says Dr. Hormiga. "Think about a book being lost in the Library of Congress. It gets put on the wrong shelf and it may take years to resurface. Museums are the same, or worse, because we're talking about millions of specimens."

With no specimen and no published illustration to go by, only a vague 170-year-old description, the genus *Leucauge* has become a bit of a spider smorgasbord.

"This is one of the biggest genera in that family," says co-investigator Dimitar Dimitrov, who accompanied Dr. Hormiga to Brazil as a post-doctoral researcher and now is an adjunct research associate. "Since the description of this one is so broad and so unspecific, it's very easy to dump things here."

The genus includes some 300 species, many "because they don't belong anywhere else—but it doesn't necessarily mean that they belong together," Dr. Dimitrov says.

In order for scientists to be able to untangle this web, they first would

bill—until they checked live spiders in the museum's botanical garden.

A spider's colors quickly melt into a silvery shade after it dies, Dr. Dimitrov says. In the end it was a live spider and Mr. Darwin's observation of a living specimen—that resplendent red, "like a ruby with a bright light behind"—that proved crucial.

Their research, published last year in the journal *Zootaxa*, revealed that *L. argyrobapta* is a "common, backyard species" in the tropics, says Dr. Hormiga. And when they compared it under the microscope against another species in the same genus, the run-of-the-mill North American orchard spider (known by the scientific moniker *Leucauge venusta*), they realized just how common this species is: The two are exactly the same.

"That's the species I have in my backyard," Dr. Hormiga says. And that goes for just about any backyard in the D.C. area and throughout the city's expansive Rock Creek Park.

"It was really just hard to believe in the beginning, to be honest, that it's so widely distributed," says Dr. Dimitrov. "But it seems that is the case."

The findings were confirmed by DNA analysis and an examination of

"common, backyard species" is way more common and backyard than anyone imagined.

When he returned with the specimen, Adam White of the British Museum found it a little worse for wear (the legs, he wrote, were "much mutilated") but he nonetheless formally and more fully described the spider in 1841.

This new iridescent, barrel-bottomed arachnid came to be called *Leucauge argyrobapta*, meaning "with a bright gleam, dipped in silver." As the only one of its kind on-hand, Mr. Darwin's spider served as the model, known as a type specimen, for describing its species. And the species in turn became the model for the new genus spawned by the spider's discovery.

need to figure out what it means to be a member of the genus *Leucauge*: What links these species? How are the species related, if at all? And that work couldn't be done as long as the model species remained largely a mystery.

With funding from the National Science Foundation, Drs. Hormiga and Dimitrov and their Brazilian colleagues set out in Rio de Janeiro in 2007 to find another specimen of Mr. Darwin's spider, which would fill the void and serve as a new model to help define the genus.

Sifting through jars of spiders in the collection of Rio's Museu Nacional, the researchers found nothing that fit the

orchard spiders collected around D.C.

The hope now, says Dr. Dimitrov, is that scientists can begin the painstaking work of revising the genus *Leucauge*. "Hopefully a few years from now we will have some better idea of how many species there are, how many genera, and what their relationships are."

The name *Leucauge argyrobapta* now takes a backseat to the older-established name of its twin, *Leucauge venusta*. Drs. Hormiga and Dimitrov have deposited their model specimen in the museum in Brazil—and this time around the scientists have left plenty of pictures. 