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Daddy longlegs multiplies from 1 to 3 species

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The short-legged form of one of three species of daddy longlegs, formerly considered a single species, *Mitopus morio*. (Barbara Thaler-Knoflach)



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By Brad Balukjian
July 4, 2013 11:01 a.m.

Scientists have discovered that what they thought was a single species of daddy longlegs is actually three, according to a new study.

The most widespread **daddy longlegs** species (which are technically harvestmen and not spiders; they have eight legs but cannot produce silk or venom) is *Mitopus morio*. These critters are found throughout North America, Asia and Europe, and there's lots of variation among them.

M. morio has both long-legged and short-legged individuals.

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species.

They started out with mating trials to see if the long- and short-legged specimens would breed with each other. The entire team gathered round to watch the males and females in plastic containers. Nothing happened.

What was wrong? Did they need a little [Marvin Gaye](#)? A couple drinks?

Sensing that the cold plastic may be too different from their natural terrain, the team added tissue paper to the floor of the containers.

"Maybe it wasn't cozy enough for them," Schlick-Steiner said.

It worked—[mating ensued](#)—and leg length by itself didn't seem to matter. Nor did the place where the daddy longlegs were collected. There were some pairings that refused to mate, however, suggesting that there may be multiple species. More data were needed.

So the researchers painstakingly examined every aspect of each individual's appearance and genetics that they could, looking for evidence of separate species.

"It's a lot like detective work," Schlick-Steiner said.

After measuring nineteen different body parts and analyzing DNA from multiple areas of the genome, they finally found some consistency in their data. Everything pointed to the existence of three different species that all looked alike (you can read a summary of the study in the journal *Molecular Ecology* [here](#)). Schlick-Steiner is holding off for now on describing them formally because the entire genus of *Mitopus* should be re-examined before making taxonomic decisions, she wrote.

It turned out the daddy longlegs were an example of "cryptic species," meaning that you can't tell them apart by looking at them. Each species had both long- and short-legged forms. Without taking the integrative approach, these species would never have been recognized. And they're probably not the only ones, Schlick-Steiner said.

"We're realizing from these studies that biodiversity is underestimated," she said.

While supporting this method, Schlick-Steiner is not delusional. She recognizes that the time and effort required to do this kind of study is not a practical way to try and document the estimated [7.5 million undiscovered species](#) still out there. But applied to certain head-scratching situations like the daddy longlegs, the process can be exemplary.

"This integrative approach allows us to unravel the truth," she said.

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But Barbara Thaler-Knoflach, an arachnologist at the University of Innsbruck in Austria and study co-author, noticed one day in the field that long-legged individuals refused to mate with short-legged ones. If they were part of the same species, why weren't they getting it on, she wondered?

Enter Birgit Schlick-Steiner, whose team at Innsbruck specializes in tackling such conundrums. Schlick-Steiner is an advocate of integrative taxonomy, in which scientists use multiple data types to determine what a species is. It's a more holistic approach than traditional approaches relying on a single criterion, such as the [mule](#) species concept (two things are separate species if they can't produce fertile offspring) or the concept used by most invertebrate taxonomists (two things are separate species if they look different).

M. morio was a prime candidate for integrative taxonomy because it seemed to violate the other notions of what a species is. Was it really just one species, or were there several?

Schlick-Steiner and her team set out to collect hundreds of specimens from two sites in Tyrol, Austria, that were about 18 miles apart. In the upland site, all of the daddy longlegs had short legs, while in the lowland site, they had long legs. The scientists suspected the two sets of critters were distinct



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