Did You Know?

Weird Mite a Worldwide Hit, Thanks to ARS Microscopy Lab

Buckeye Dragon Mite (*Osperalycus tenerphagus*). Image by ARS Electron and Confocal Microscopy Research Unit.

If you were a bacterium or yeast inhabiting the soils, you definitely wouldn't want to encounter *Osperalycus tenerphagus*, a.k.a. the Buckeye Dragon Mite. Less than 1 millimeter long, this wormlike mite sports mouth appendages designed to capture hapless microbes and suck out their juices.

The tiny but ravenous feeder is a descendent of mites from around 400 million years ago. But it wasn't until February 2014 that the species became known to science through the efforts of a team of Agricultural Research Service (ARS) and Ohio State University (OSU) scientists.

Sam Bolton, an OSU doctoral researcher at the time working under the guidance of OSU professor Hans Klompen and funded by the Smithsonian National Museum of Natural History Fellowship Program, literally unearthed the species from the university's campus grounds. Bolton's familiarity with the work of **Ron Ochoa**, an entomologist specializing in mites at ARS's Systematic Entomology Laboratory in Beltsville, MD, led to a collaborative project to scientifically describe the species.

Ochoa enlisted the talents of microscopist **Gary Bauchan** at the Electron and Confocal Microscopy Research Unit, a part of ARS's Soybean Genomics and Improvement Laboratory, also in Beltsville. Keen on preserving the physical integrity of the live specimens that Bolton had brought with him from Ohio, Bauchan used a technique pioneered at his facility to prepare the mites for low-temperature electron microscope imaging.

The technique, which generates high-resolution images of specimens by "bouncing" electrons off them, necessitates flash-freezing the specimen in a vat of liquid nitrogen and then spraying it with a thin coat of platinum. Together, these steps allowed Bauchan to capture the mites in their final moments of life and in the physically intact state so crucial to their scientific identification and accurate description.

The images, magnified up to 30,000 times the Dragon Mite's original size, were visually stunning and, as it turns out, a huge hit with not only the scientific community—as reported in web pages by the American Association for the Advancement of Science, Smithsonian Institution, USDA's blog page, and Entomological Society of America—but also the public at large, thanks to coverage by *Wired*, *Scientific American*, *The Washington Post*, *The Columbus Dispatch*, *The Guardian* (Britain), *Estadao* (Brazil), *Der Spiegel* (Germany), and other worldwide news organizations.

The team published its findings online February 20, 2014, in the *Journal of Natural History*, marking the first report of a new mite species in the family Nematalycidae in 40 years. Since then, their paper has been downloaded an astounding 87,500 times and counting.

"The number of downloads and views of this scientific paper are possibly unprecedented for our center's research," says Bauchan.

"Every time I see the latest figure on the number of downloads, I am flabbergasted," says Ochoa, whose work, together with Bauchan's, provides vital support to other researchers as well as plant protection and quarantine officials tasked with safeguarding U.S. agriculture from invasive species.

The Buckeye Dragon Mite, for its part, poses no such threat—unless, of course, you're a tasty soil bacterium.—*Written by **Jan Suszkiw**, ARS Information Staff*.

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