



On the Importance of Scientific Collections

A Series by
Natural Science Collections Alliance

Bees Are Not Optional: To Know How Bees Fare, You Must Know Who They Are

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Sam Droege's native bee lab at the United States Geological Survey (USGS) Patuxent Wildlife Research Center in Laurel, Maryland, looks like a microcosm of a Smithsonian museum: a long table stacked with hundreds of small, white boxes of native bees, microscopes, drawers and trays with yet more bees, identification manuals, and collecting equipment (butterfly nets, bee bowls) stashed here and there.

Droege is an expert in developing long-term monitoring programs, especially for groups of animals where little is known. So when Droege, a self-described "beehead," realized the miniscule amount of scientific information known about the status and health of native bees – let alone how to identify the different bees – he went to work.

Like other beeheads, he had read the 2006 National Research Council report that detailed how pollinator populations in North America are in decline or lack sufficient data to be effectively evaluated. It went on to emphasize that effective surveillance and monitoring of bee populations is highly dependent on valid species identification and robust taxonomic classifications.

"Bees are not optional," Droege said.

Without them, the ability of agricultural crops and wild plants to produce food products and seeds is jeopardized. Over 75 percent of flowering plants rely on pollinators, and they are responsible for an estimated \$15 billion in services to agriculture alone in the United States. Pollinators are equally as important to sustaining ecosystem functions and food supplies for wildlife.

"But before we can monitor, we need to know who we are finding – and that means we have to be able to correctly identify 4,000 native bee species, most of which are quite small," said Droege. "So my first task was to develop valid species identifications and robust taxonomic classifications."

Enter the Smithsonian bee collections.

"I've been over at the Smithsonian so much while examining their specimens to validate my identification keys that they've even given me my own space," Droege said.



Bees are important pollinators of agricultural crops and wild plants (photo: Laurie Allen, USGS).



Part of the native bees collection at the USGS Patuxent Native Bee Lab (photo: Catherine Puckett, USGS).

With funding from the USGS' National Biological Information Infrastructure and support from Discover Life, the Ambrose Monell Foundation, and the National Fish and Wildlife Foundation, Droege led a team of scientists and taxonomists from the American Museum of Natural History and the University of Georgia-Athens to create online identification guides for the bees of North America. The guide is based on museum specimens and Charles Duncan Michener's *The Bees of the World*.

"The most important thing," said Droege, "is that researchers from the Department of the Interior, U.S. Department of Agriculture, and from various academic institutions have now completed much of the work necessary in order for us to effectively monitor and survey the status and health of our native bees."

Surveys, he said, have already begun or are set to begin soon in some of the country's national parks, refuges, state lands, and other areas.

"These museum collections are our only window back in time," Droege said. "When we get some of these surveys done, we can compare what was present historically with what is present now and get a better idea of the welfare of our native bees."

About USGS

The USGS is a federal science organization that provides impartial information on the health of our ecosystems and environment, the natural hazards that threaten us, the natural resources we rely on, the impacts of climate and land-use change, and the core science systems that help us provide timely, relevant, and useable information.

About NSCA

The NSC Alliance is a nonprofit association that supports natural science collections, their human resources, the institutions that house them, and their research activities for the benefit of science and society. Our 100 institutional members are part of an international community of institutions that house natural science collections and utilize them in research, exhibitions, academic and informal science education, and outreach activities.

For more information

Bee Identification Guides presented by Discover Life:
<http://www.discoverlife.org/20/q?search=Apoidea#Identification>

USGS' National Biological Information Infrastructure Bee Guide Fact Sheet:
http://pollinators.nbi.gov/documents/Bee%20ID%20Guide%20fact%20sheet_Jul2010.pdf

The Very Handy Bee Manual: How to Catch and Identify Bees and Manage a Collection:
<http://pollinators.nbi.gov/documents/Handy%20Bee%20Manual.pdf>

USGS Podcast: Bees Are Not Optional:
<http://www.usgs.gov/corecast/details.asp?ep=100>

North American Pollinator Protection Campaign:
<http://pollinator.org/nappc/index.html>