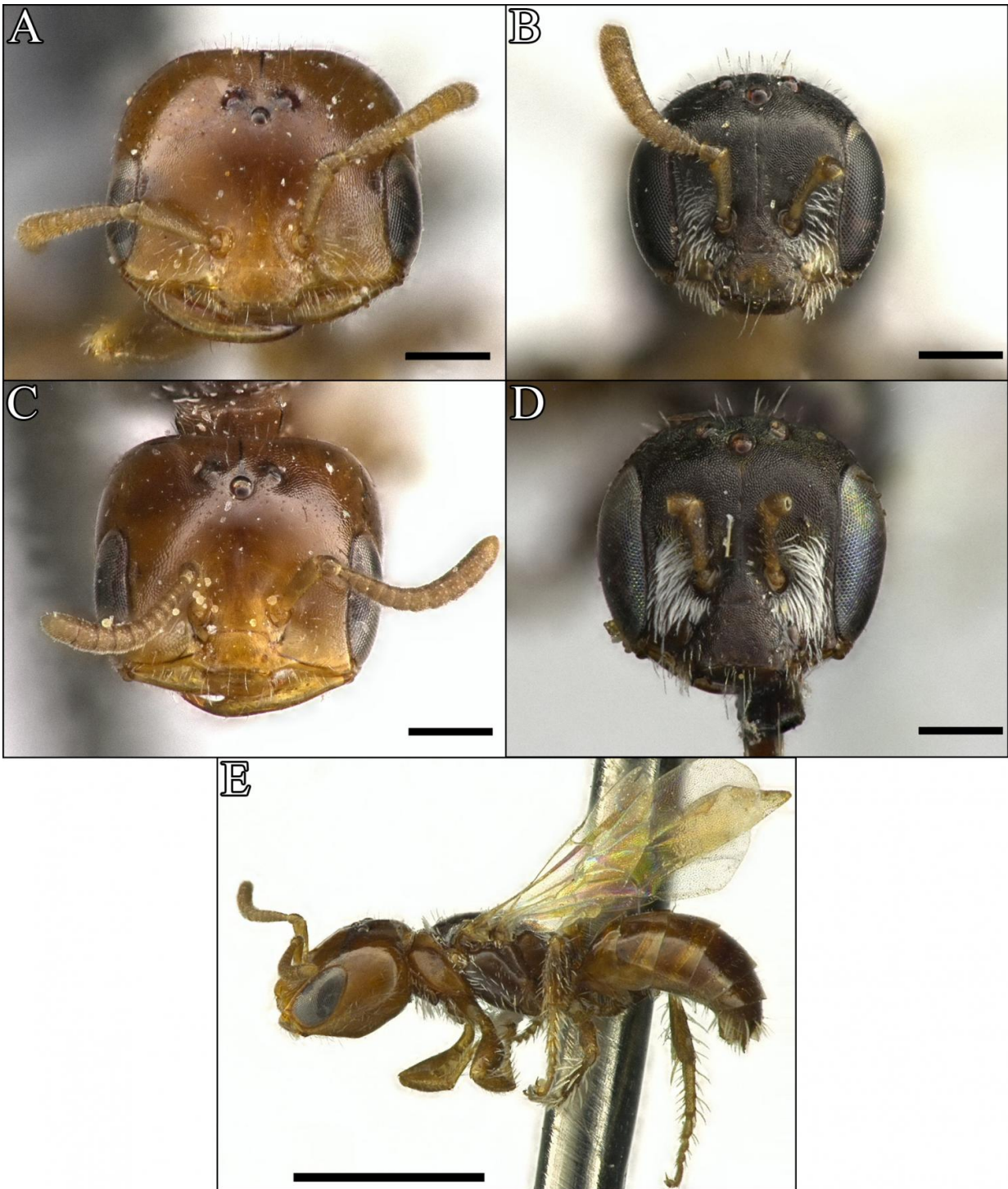


# 'Ant-like' bees among new desert species identified by USU entomologist

December 24 2016, by Mary-Ann Muffoletto

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Utah State University entomologist Zach Portman reports nine, newly identified species of desert bees of the genus *Perdita*, including two species of ant-like males (pictured), which are completely different in appearance from their mates. Credit: Zach Portman, Utah State University

Though declines in bee populations have heightened awareness of the importance of pollinating insects to the world's food supply, numerous bee species remain undescribed or poorly understood.

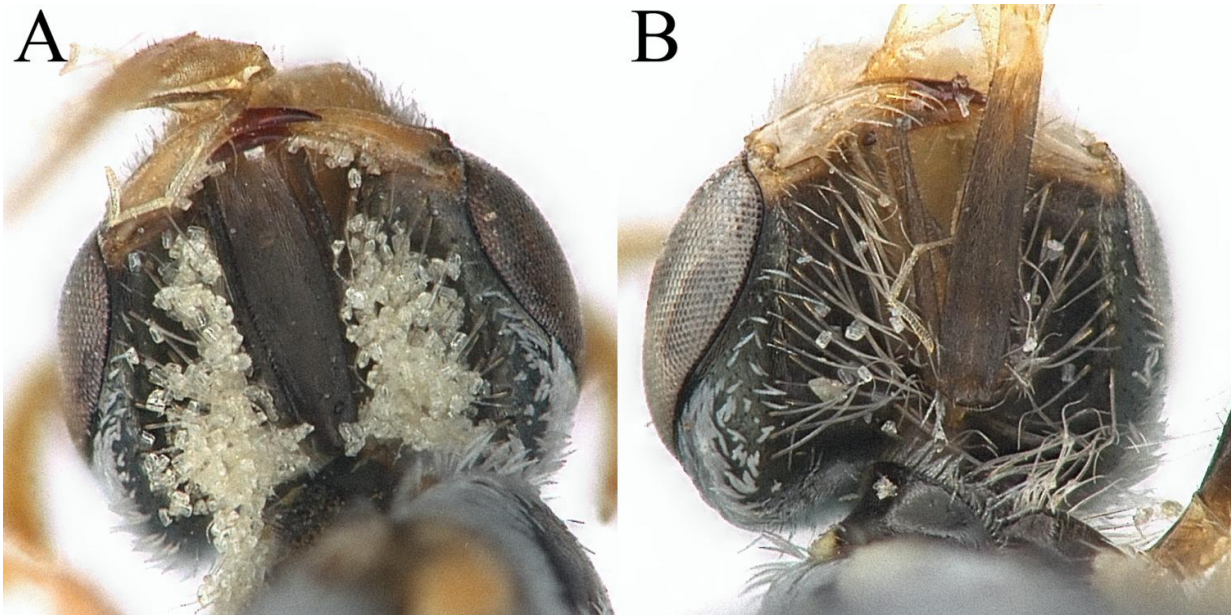
Utah State University entomologist Zach Portman studies a diverse group of solitary, desert bees that aren't major pollinators of agricultural crops, but fill an important role in natural ecosystems of the American Southwest, including the sizzling sand dunes of California's Death Valley.

With Terry Griswold of the USDA-ARS Pollinating Insects Research Unit at Utah State and John Neff of the Central Texas Melittological Institute in Austin, Portman reports nine, newly identified species of the genus *Perdita* in the December 23, 2016, issue of *Zootaxa*. His research was supported by a National Science Foundation Graduate Research Fellowship awarded in 2011 and a Desert Legacy Grant from the Community Foundation.

Unexpected finds include the curious ant-like males of two of the species, which are completely different in appearance from their mates.

"It's unclear why these males have this unique form, but it could indicate they spend a lot of time in the nest," Portman says. "We may find more information as we learn more about their nesting biology."

Some of these bees, found exclusively in North America, sport scientific names inspired by Shakespearean characters, such as *Perdita titania*, named for the fairy queen from *A Midsummer Night's Dream*. Elusive and tiny, Portman tracks the bees by watching for their buzzing shadows in the blinding, midday sunlight the diminutive insects tend to favor.



Utah State University entomologist Zach Portman reports nine, newly identified species of desert bees of the genus *Perdita*. The tiny desert bees sport an adaptation called a “hair basket,” which enables the bees to collect pollen as they dunk their heads into crinklemat blossoms. Pictured left (A) is the underside view of a *Perdita coldeniae* female collected in Riverside County, California, showing a head basket full of crinklemat (*Tequilia*) pollen and left, a *Perdita coldeniae* female, collected in Imperial County, California, with an empty head basket. Credit: Zach Portman/Utah State University

"Their activity during the hottest part of the day may be a way of avoiding predators," says the doctoral candidate in USU's Department of Biology and the USU Ecology Center. "They appear to be important pollinators of desert plants commonly known as 'Crinklemats.'"

Crinklemats, flowering plants of the genus *Tiquilia*, grow low to the ground and feature ridged, hairy leaves and small, trumpet-shaped blue blossoms.

"Like the bees, *Tiquilia* flowers are very small," Portman says. "The bees must squeeze into the long, narrow corollas and dunk their heads into the flowers to extract the pollen."

The scientists report the female bees use pollen collected from the flowers to build up a supply to nourish their young. Once they have completed a pollen provision, the bees lay their eggs on the stash and leave their offspring to fend for themselves.

Portman says the bees have developed a special adaptation called a "hair basket," with inward-facing, hooked hairs, that allows them to collect pollen as they dive into a flower.

"We don't yet know if the bees use their legs to scoop pollen into the basket or if they simply collect it using their heads," he says. "There's still a lot of unknowns."



Utah State University entomologist Zach Portman, a recipient of the National Science Foundation Graduate Research Fellowship, reports nine, newly identified species of the desert bee genus *Perdita* in the Dec. 23, 2016, issue of *Zootaxa*. Credit: Mary-Ann Muffoletto/Utah State University

Portman says understanding more about these adaptations between the bees and the flowers they pollinate may be critical to the preservation of their surrounding environment.

Beyond their role as pollinators, he says the bees are interesting from an ecological and evolutionary standpoint due to their adaptations to arid habitats and high contrast color patterns.

"Some of the bees feature stripes and others have spots, which could be patterns for camouflage or a form of mimicry," Portman says. "These are characteristics we're still exploring."

Much of what Portman and his colleagues know about bees of the *Perdita* genus is built upon the work of the late University of California, Riverside entomologist Phillip Hunter Timberlake. Born in 1883, Timberlake described and named more than 800 bee species during his astounding 70-year career.

"Timberlake was considered eccentric, but his scholarship is to be admired," Portman says. "Although identifying *Perdita* and finding the bees' nests is challenging, these [bees](#) have a lot to tell us about adaptation to a harsh and inhospitable environment."

**More information:** Portman, Zachary M., John L. Neff and Terry Griswold. "Taxonomic revision of *Perdita* subgenus *Heteroperdita* Timberlake (Hymenoptera: Andrenidae), with descriptions of two ant-like males," *Zootaxa*, 23 Dec 2016.

[dx.doi.org/10.11646/zootaxa.4214.1.1](https://doi.org/10.11646/zootaxa.4214.1.1)

Provided by Utah State University

Citation: 'Ant-like' bees among new desert species identified by USU entomologist (2016, December 24) retrieved 25 April 2024 from <https://phys.org/news/2016-12-ant-like-bees-species-usu-entomologist.html>

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