Perdita geminata (Andrenid Bee)

No Photo Available

Taxonomy

- **Class**: INSECTA
- **Order**: HYMENOPTERA
- **Family**: ANDRENIDAE
- **Genus**: Perdita
- **Scientific Name**: *Perdita geminata* Timberlake, 1964
- **Common Name**: Andrenid Bee
- **Synonyms**:
- **Taxonomic Name Source**:Integrated Taxonomic Information System (ITIS). 2008. World Bee Checklist Project (version 03-Oct-2008). Integrated Taxonomic Information System: Biological Names. Online. Available: http://www.itis.gov.

Agency Status

- **NMDGF**:
- **Federal Status**:
- **BLM Sensitive**:
- **USFS**:
- **IUCN Red List**: Not Evaluated
- **Nature Serve Global**: GNR
- **NHNM State**: S1
- **NM Endemic**:NO

Description

In females, the head and thorax of this species are dark blue, with some brown around the clypeus, occasionally with some white marks near the clypeus and on the pronotum. The abdomen is blackish, though it is tinged with brown, especially on the underside. The abdomen has two white spots on tergite one and broad white bands on tergites two through four, that are narrowly interrupted in the middle. Tergite five also has some white marks. Males resemble *Perdita confusa* and *P. fremonti* in the face marks, but the abdomen is banded on tergites one through six, similar to the female (Timberlake 1964).

Habitat and Ecology

Very little is known about the habitats and ecology of *Perdita geminata.* It has been collected in several areas with high gypsum content in the soil, such as White Sands National Monument. It is unknown whether it might be a specialist in this soil type. Most records have been taken from within the Chihuahuan Desert, though the Utah record was taken from the Colorado Plataea ecoregion. Species of *Perdita* are almost all oligolectic (Michener 2007). As such, their emergence is usually timed to coincide with the floral bloom period of their host plants (Wilson and Carril 2016). This species has been collected from both creosote (*Larrea* spp.) and tamarisk (*Tamarisk* spp.), which is an invasive riparian plant (*Prosopis* spp.). Therefore, host specificity is unknown. Records have been taken from April though September (Timberlake 1964).

Though the nesting habits of this species are unknown, *Perdita* generally nest in the soil, within branching burrows that each ending in a single cell, which is more or less horizontal (Michener 2007). A few species nest gregariously, with females nesting in close proximity to one another (Wilson and Carril 2016). Other species are communal nesters, with more than one female sharing a nest entrance (Michener 2007), yet others are more solitary. Instead of covering nest cells in a water proof coating, like other species in the family Andrenidae do, *Perdita* cover only the spherical ball of

pollen provisioned for larvae in a coating (Wilson and Carril 2016). Many species are specific about the soil type they choose to nest in (Wilson and Carril 2016). Adult emergency seems to be dependent on humidity levels which indicate significant rain events above ground, at least for desert species (Wilson and Carril 2016).

Geographic Range:

Perdita geminata is found in several arid regions of the western United States. So far it has been documented in New Mexico, Utah, and West Texas (Timberlake 1964, Chesshire *et al*. 2023).

Conservation Considerations:

There are no conservation actions in place for this species. It has been recorded in at least one protected area, White Sands National Park, though it is not removed from the threats of habitat instability and drought at this site. Research is needed to verify the species remains extant. In addition, a better understanding of the distribution, population size and trend, habitats and ecology, and threats is needed for this species.

Threats:

The threats to this species are not well understood, though drought is likely the main threat across its range. The southwestern U.S. saw its driest 22-year period from 2000 to 2021, since at least 800 CE (the time period used in previous climatic reconstructions) (Williams *et al.* 2022). Droughts are projected to become more prolonged, severe, and common in the region under future climate change scenarios (USGCRP 2018). Drought may negatively impact bee species by reducing floral resource availability (Phillips *et al.* 2017). In addition, declines observed in *Perdita* species at one site the Chihuahuan Desert have been attributed to small body size of these bees, and associated sensitivity to heat and desiccation (Kazenel *et al*. 2024).

In addition, where the species is found at White Sands dune field, dune instability due to extensive groundwater extraction on the eastern edge of the Tularosa Basin is a growing concern. Hydrologic modeling has shown that increased groundwater pumping in response to increased temperatures and drought conditions will lead to water level decreases up to 1.5 meters. The dune field only exists as a permanent landscape feature because the gypsum sands are held in place at the base by water weight wicked up from the ground, so a decrease in water resources could result in increased sand motility, and therefore instability of the interdune habitats where bees nest and forage (Bourret 2015).

Population:

The population size and trend are not known for this species. It has not been observed or collected since 1966 (Chesshire *et al*. 2023), so it may be quite rare.

References:

- Williams, A.P., Cook, B.I. and Smerdon, J.E. . 2022. Rapid intensification of the emerging southwestern North American megadrought in 2020â€“2021. *Nature Climate Change* 12: (232-234).
- Michener, D.C.. 2007. The Bees of the World. The Johns Hopkins University Press, Baltimore : (953).
- USGCRP. 2018. Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II. *U.S. Global Change Research Program* , Washington, DC, USA : (1515).
- ITIS. 2024. Integrated Taxonomic Information System (ITIS). 2024. https://www.itis.gov/

- Timberlake P.H.. 1964. A revisional study of the bees of the genus *Perdita* F. Smith, with special reference to the fauna of the Pacific Coast (Hymenoptera, Apoidea) Part IV. *University of California Publications in Entomology* 28: (125-388).
- Kazenel, M.R., Wright, K.W., Griswold, T., Whitney, K.D. and Rudgers, J.A.. 2024. Heat desiccation tolerances predict bee abundance under climate change. *Nature* 628: (342-362).
- Bourret, S.M.. 2015. Stabilization of the White Sands gypsum dune field, New Mexico, by groundwater seepage: a hydrological modeling study.. New Mexico Institute of Mining and Technology, Socorro, New Mexico .
- Phillips, B.B., Shaw, R.F., Holland, M.J., Fry, E.L., Bardgett, R.D., Bullock, J.M. and Osborne, J.L.. 2017. Drought reduces floral resources for pollinators. *Global Change Biology* 24: (3226-3235).
- Chesshire, P.R., Fischer, E.E., Dowdy, N.J., Griswold, T.L., Hughes, A.C., Orr, M.C, Ascher, J.S. Guzman, L.M, Hung, K-L.J., Cobb, N.S. and McCabe, L.M.. 2023. Completeness analysis for over 3000 United States bee species identifies persistent data gap. *Ecography* e06584: (13-Jan).
- Wilson, J.S. and Carril, O.M. 2016. The Bees in Your Backyard: A Guide to North America's Bees. Princeton University Press, Princeton, NJ .

More Information