An Inventory of Native Bees (Hymenoptera: Apiformes) in the Black Hills of South Dakota

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Severin-McDaniel Insect Research Collection

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Introduction:

Worldwide there is concern for pollinator decline, but many major pollinator groups and geographic areas remain poorly studied and lack population and occurrence data (NRC 2007). The native bees of South Dakota are no exception to the lack of population and occurrence data. The Black Hills is an ecologically diverse region located on the border of South Dakota, and Wyoming (Fig. 1). Sampling in the Black Hills took place in 2010 and 2011. With ca. 4,000 bee species in North America (Michener 2007), there were over 200 species of native bees predicted for the Black Hills prior to this inventory based on available catalogs.

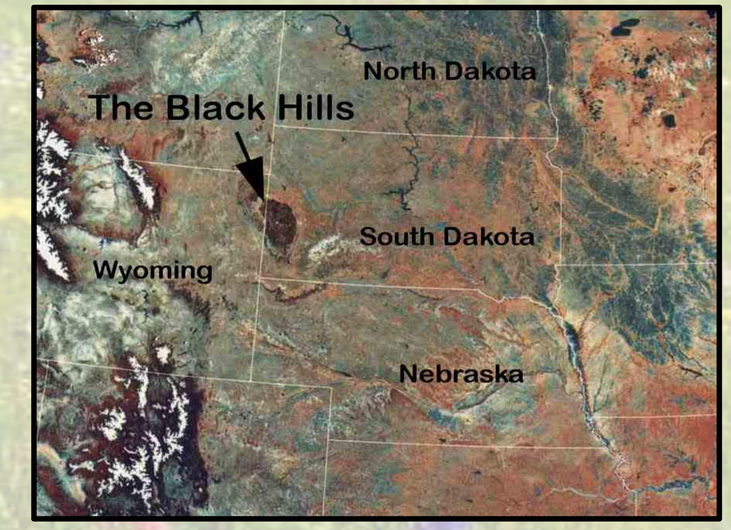

Fig. 1. Study area: The Black Hills

Objectives:

- Complete an inventory of native bees of the Black Hills, including a database of published and unpublished records, and identify specimens newly collected
- Focus field collections on exemplary meadow, forest, and shrub-steppe habitats in the areas of Custer, Fall River, Lawrence, and Pennington Counties of South Dakota
- Document host flowers
- Associate habitat and location data to voucher specimens to support future assessments of patterns of species occurrence related to environmental variables such as land use, habitat type, elevation, and geography

Methods:

Site Selection:

- Varied habitat types and geographic locations
- Floral resources present
- Sampled from mid May to September of 2010 and 2011

Pan trap collection:

- 30 bowls per site - fluorescent blue, fluorescent yellow or white (Fig. 2); each color attracts different species and sexes
- Placed 5-8 m apart in linear transect (Fig. 3)
- Filled with soapy water and set for 24 hours

Fig.2. Pan-traps.

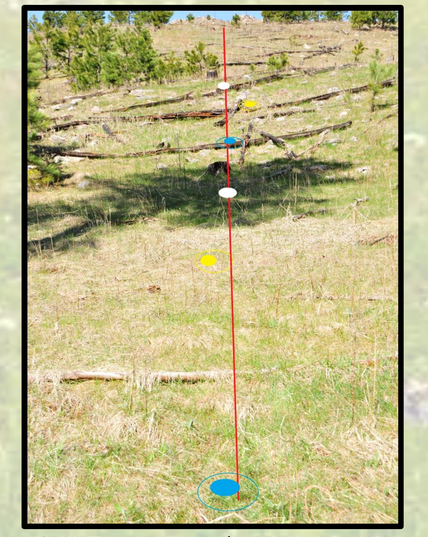

Fig. 3. Transect example.

Aerial Net Collection:

- Sampling goal of 1 hour per site (rarely met due to weather and time constraints by individual event)
- Concentrated on plants in bloom
- Recorded floral host data for individual bees
- Advantage: collection of rare bees and those not attracted to bowls
- Bias: ability of collector and time of day

Post Collection Processing:

- Bees are washed, dried, pinned and labeled
- Identified using dichotomous keys, taxonomic literature, and reference collections
- Database entry

Results:

- 21,910 bees collected
- 363 species known to occur in the Black Hills (Fig. 4)
  - 296 species collected during 2010 and 2011, an increase of nearly 30%
  - 67 species from historical records were not collected during 2010 and 2011
  - 1 new *Dianthidium* species
  - 118 species not previously recorded in the region
  - 102 morphospecies (individuals appear different from confirmed species and may be additional nameable or new species).
- 94 sites sampled (pan trap and net collection) in all major habitat types throughout the region (Fig. 5)
- ca. 88,000 trap-hours
- 47 exclusively hand netting sites and 35 volunteer collecting sites

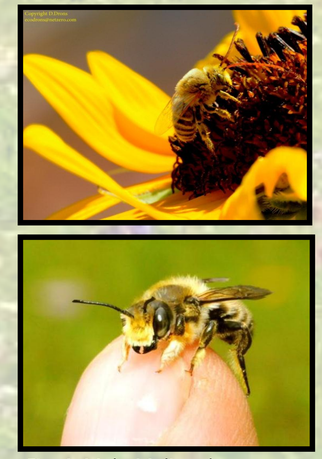

Fig. 4. Male *Melissodes* sp. (top), Male *Megachile* sp. (bottom).

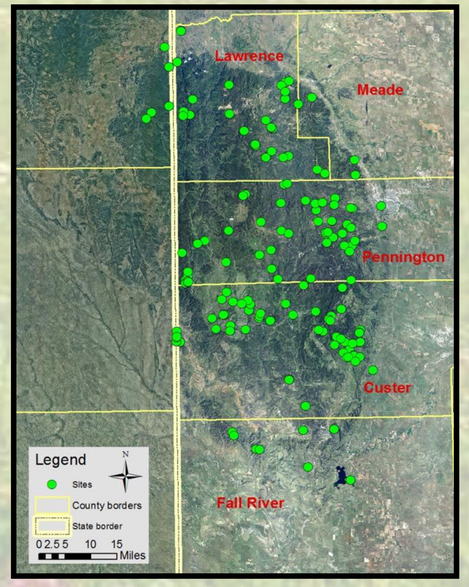

Fig. 5. Map of study sites in the Black Hills.

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References Cited:

Michener, C.D. 2007. *The Bees of the World* 2nd Edition. The Johns Hopkins University Press, Baltimore. 953 p.

National Research Council. 2007. *Status of Pollinators in North America*. The National Academies Press, Washington, D. C. 307 p.