FINAL REPORT
South Dakota Bee Database and Sampling in Selected Mesic Prairies

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Caitlin Krueger and Paul J. Johnson
Insect Research Collection, South Dakota State University, Brookings

Summary

This project was designed to construct a database of the bees in the Insect Research Collection at South Dakota State University and to survey the native bee populations at three mesic prairie remnants in east-central South Dakota.

Database compilation resulted in 5929 records (see attached SD Bees.xls) of native South Dakota bees representing five (5) families, and approximately 49 genera and 240 determined species.

Sampling of three prairie preserve sites was conducted, namely Brookings Prairie (Brookings Co.), Aurora Prairie (Brookings Co.), and Sioux Prairie (Moody Co.). This fieldwork resulted in the recovery of five families represented by 13 genera and 42 species.

Project Background

The goal of this project was to gain a better understanding of our native bee populations in South Dakota and to create a store of data from which further research may be conducted. We started this project because we realized that very little research on bees, especially native bees, has been done in South Dakota. Historically, no dedicated or extensive collecting of native bees has been done, beyond student oriented short term and geographically limited studies on bumblebees and bees of north-central South Dakota. Examination of the contents of the Insect Research Collection at South Dakota State University shows that relatively few specimens have been collected since the 1940's and that most of the collection is a result of more-or-less random collecting over the last 100 years.

While the Severin-McDaniel Insect Research Collection (SMIRC) at South Dakota State University has accumulated a notable collection of bees from the state with a great deal of data (taxonomic information, locations, dates of collection), none of this data was compiled in a contemporary manner that provided for ease of sorting and analysis. Further, many of the specimens in the SMIRC had not been collected in eastern South Dakota, leaving the tallgrass prairie areas poorly sampled for native bees.

Part of the project consideration included an approximation of how the local expansion of agriculture and urbanization has changed local bee diversity. However, with the extensive loss of expansive prairie the sampling sites are only isolate islands (Aurora and Brookings Prairie) surrounded on all sides by crops, cattle, and housing. The area around Sioux Prairie is less densely populated but is still intensively farmed and ranched.

Native bees and the introduced honeybee are all exceedingly important for pollination of most prairie plant species and many agricultural crops. They are also useful as indicators of habitat change due to human activity and natural changes. The database compilation lays the necessary groundwork for understanding changes in native bee populations and the potential of native pollinators in South Dakota agriculture.

Insect Research Collection Database Compilation

Much of the SMIRC bee collection had not been organized or maintained since the 1950's, so the first step of the project was its organization and updating of taxonomic names. The intended database goal was to record each specimen and its label data to a spreadsheet so that the essential data was available. These records and data are now readily updatable and can be made available online at any time. Many specimens in the collection had become damaged over time, mostly due to dermestid beetles, an ever-present nuisance in the collection. In a few cases, specimens had gone missing but their labels still remained. The data for these missing specimens was recorded.

Total bee collection database compilation resulted in 7017 records. Of these, 5929 records (see attached SD Bees.xls) are of native South Dakota bees representing five (5) families, and approximately 49 genera and 240 determined species. The raw data taken from specimen labels was supplemented when necessary or possible with classificatory or geographic information to complete records.

Field Sampling

In an effort to supplement the SMIRC records with new material, increase information on bees of east-central South Dakota, and seek potential new state records of species from rare habitats, field sampling was conducted at three native mesic prairie sites. The three sites were Aurora Prairie and Brookings Prairie, both in Brookings County, and Sioux Prairie in Moody County. Aurora and Sioux Prairie are managed by the Nature Conservancy. Brookings Prairie is managed by the city of Brookings. In addition, the McCrory Gardens managed by South Dakota State University, was sampled opportunistically in order to ascertain the degree to which native bee species were present and successful in surviving a large and intensely managed site.

Each prairie site was sampled on a rotating basis, usually one to two sites per day, as weather allowed. Because many native bees are most active during morning or late afternoon periods, sampling efforts were directed appropriately. At each location the prairie site was walked to locate where native flowers were currently in bloom, and bees were collected whenever spotted on the flowers or in the air. A site was usually visited for around two hours or until the bees ceased daily activity.

Because the project lasted only one sampling season, we attempted to collect the maximum number of species by sampling from three local prairie preserve sites during the late spring through summer months. Different bee species become active at different times of the year and any given species may be active for only a few weeks. Several times we caught bees that we had not caught before in the field season and may have appeared in our catch only once more on a subsequent visit.

The field sampling yielded 5 families of bees: Apidae, Megachilidae, Halictidae, Andrenidae, and Colletidae. A total of 568 specimen records were made and these are presented in the Excel file "2008 Prairie Bees." While we are unable to accurately determine many of the bees to species, our most conservative estimate based on our collection is 13 genera and 42 species. Identification was done mostly by comparison with determined specimens in the SMIRC or with The Bees of the World, 2nd Edition, by Charles D. Michener.

Notable Notes

We would like to note that several factors may have affected the available population and the diversity of our catch, including unseasonably cold temperatures well into June, and the fact that both the Sioux and Aurora prairies had undergone controlled burns shortly before the start of our project. Also, the season brought many storms that left our sites very wet, and most insects including our bees were inactive, or far less active, for several hours afterward. Usually the bees remained elusive until the sample site dries and warms. The summer storms often rolled in during collection and cut short our collection time.

It should be noted that the entire collection season appears to have yielded only one male bee collected at McCrory gardens. Male bee life spans are notoriously short; usually they don't live long beyond mating and rarely travel far beyond the nest where they hatched. This lack of male specimen availability has made keying out many of the Halictid bees difficult, as they require specimens of both genders to successfully key.