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Digitization of Entomological Collections at USU, Eastern Using SCAN (Symbiota Collections of Arthropods Network) Data Portal and Seek! iNaturalist App

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Digitization of entomological collections at USU, Eastern using SCAN (Symbiota Collections of Arthropods Network) data portal and Seek! iNaturalist app

Introduction

Pollinators, including bees, provide valuable ecosystem services for native plants and agricultural species. Phenology, or the timing of biological events such as flowering of plants, is changing as a result of climate change. The digitization of specimens allows for insights into species distributions, seasonality, and phenology in 60-70 year old collections.

Materials and methods

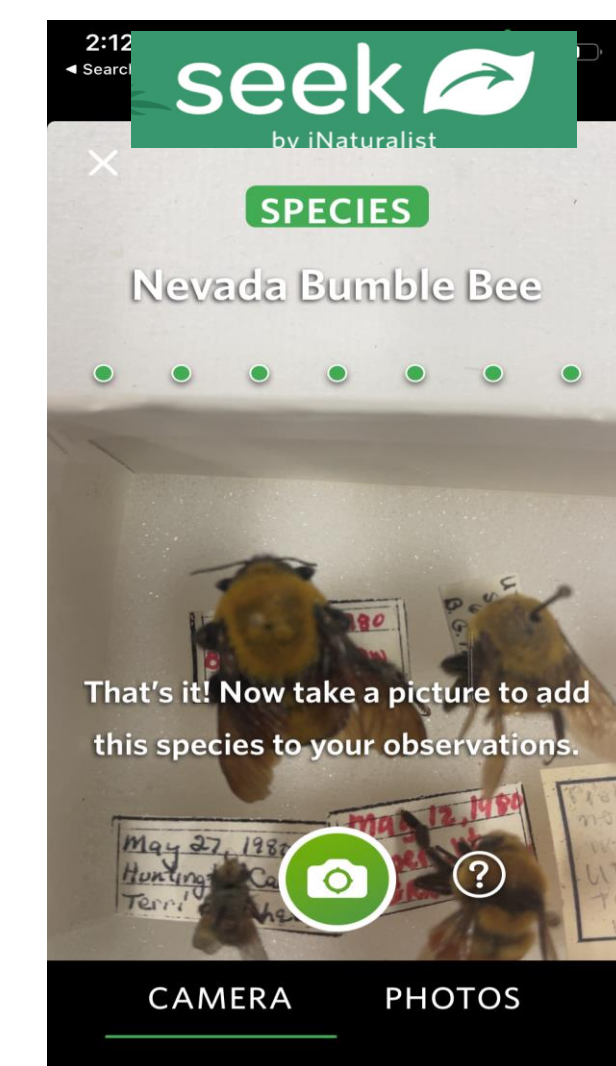
Identify complete specimens with dates & locations

Create a unique collection ID for each specimen

Use the SEEK App for preliminary identification of specimens

Expert determination of specimen identification

Photograph each specimen and enter into SCAN



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Preliminary Results

The entomological collection at Utah State University, Eastern:

- houses approximately 3,000 individual specimens, over 100 bees
- oldest specimens date from 1953, many from the 1960s, 70s, & 80s
- majority of specimens are from Carbon and Emery Counties



- Carbon & Emery Counties are underrepresented in the current SCAN data portal (Fig. 1, Fig. 2, & Fig. 3)
- Adding collections that are over 50 years old will assist in determining changes over the past half century (Fig. 4)



Challenges included:

- date labels of the specimens were confusing (Roman numerals for months)
- location names have changed and not all specimens included dates or locations

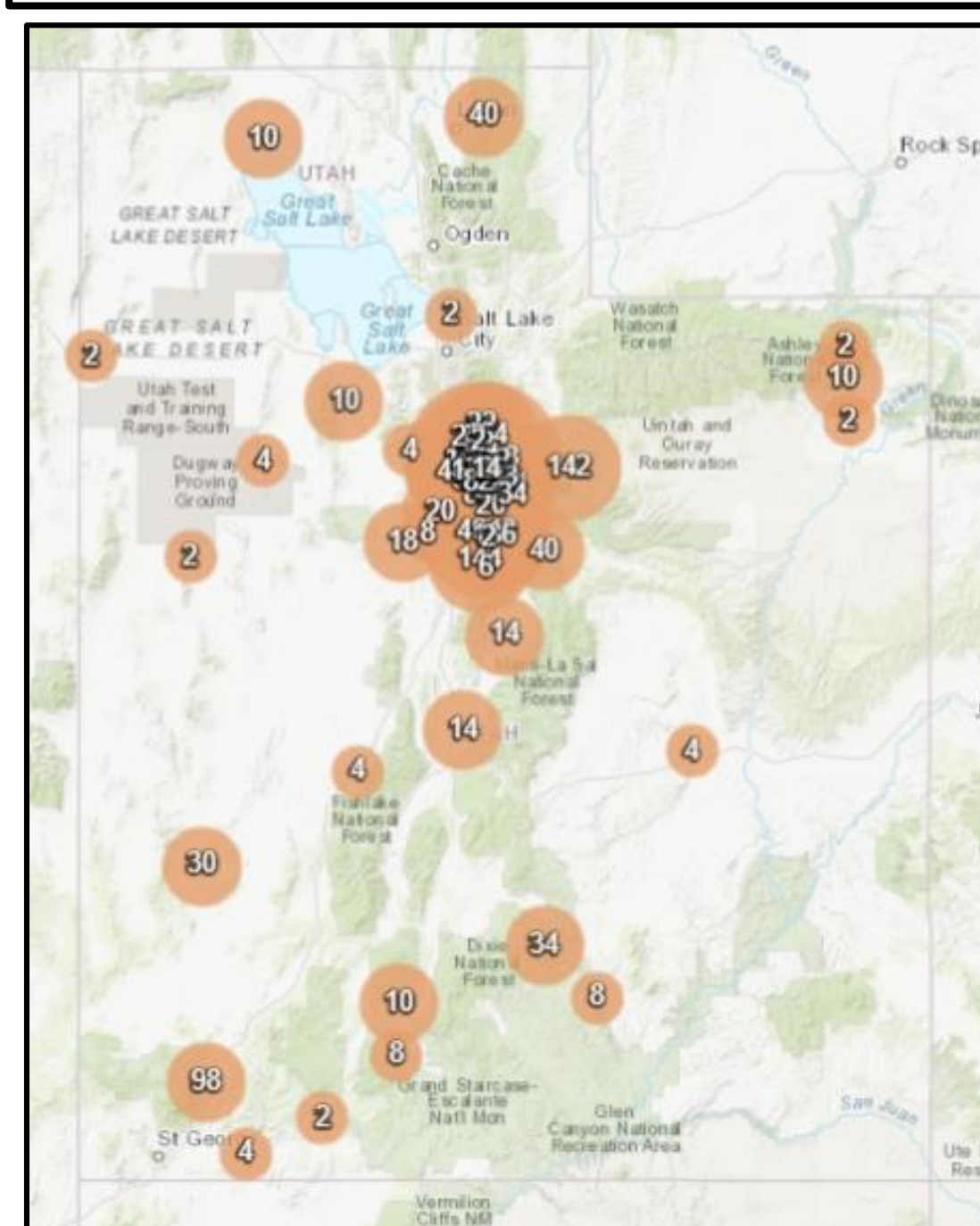
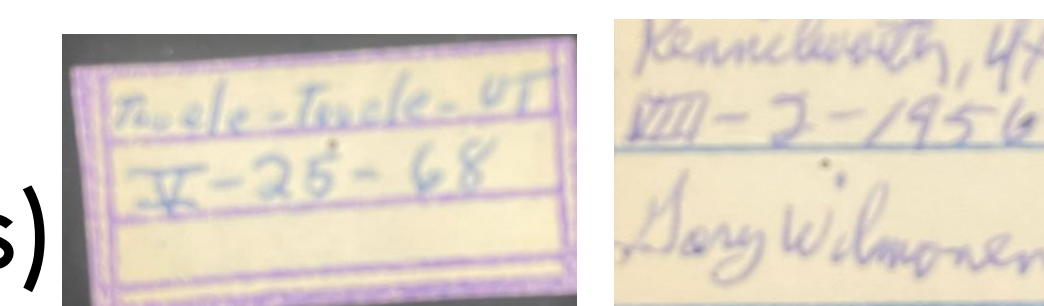


Figure 1: Utah Arthropod specimens, SCAN data portal

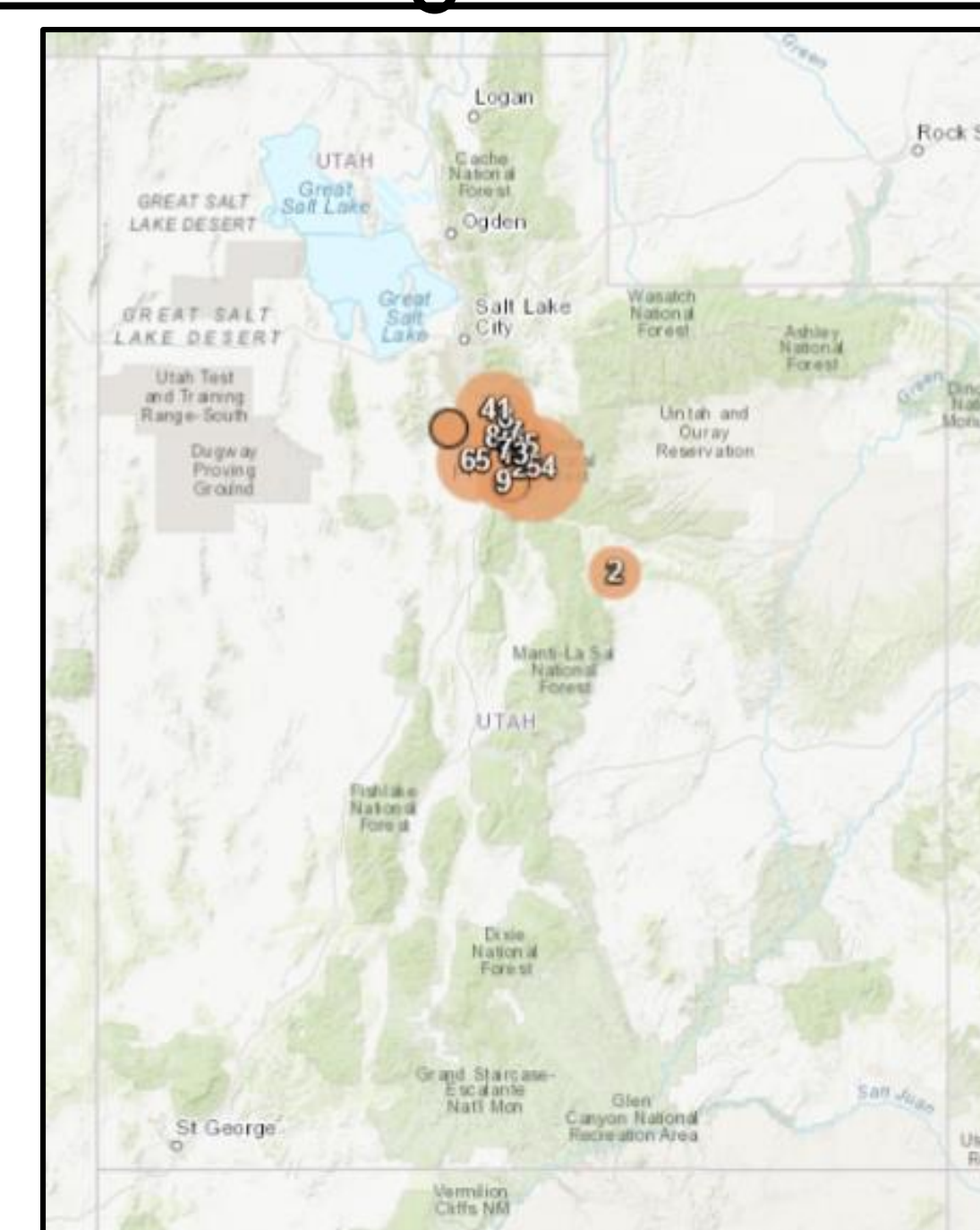


Figure 2: *Bombus* specimens, SCAN, n=462

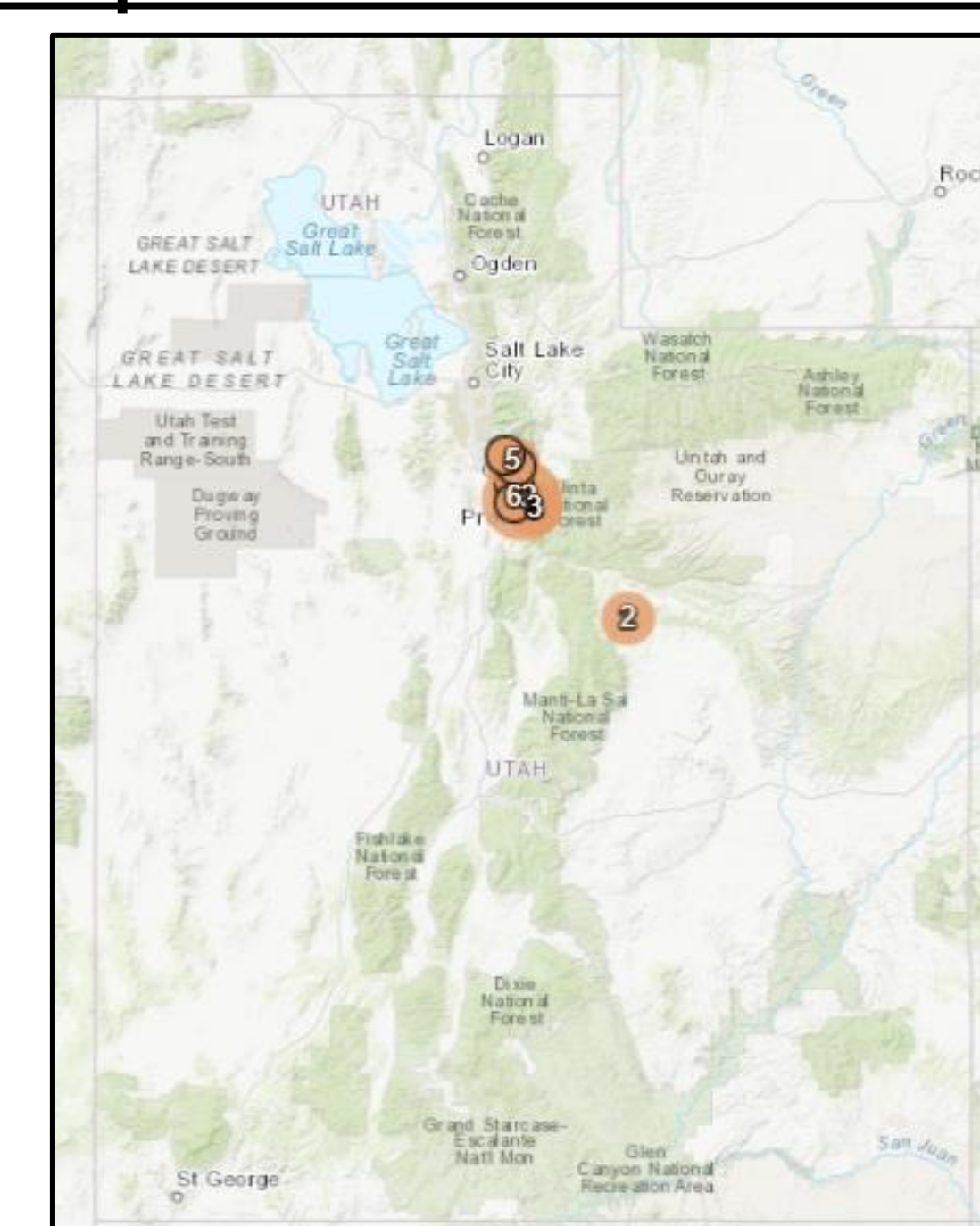


Figure 3: *Bombus occidentalis*, 1926-2011, n=79

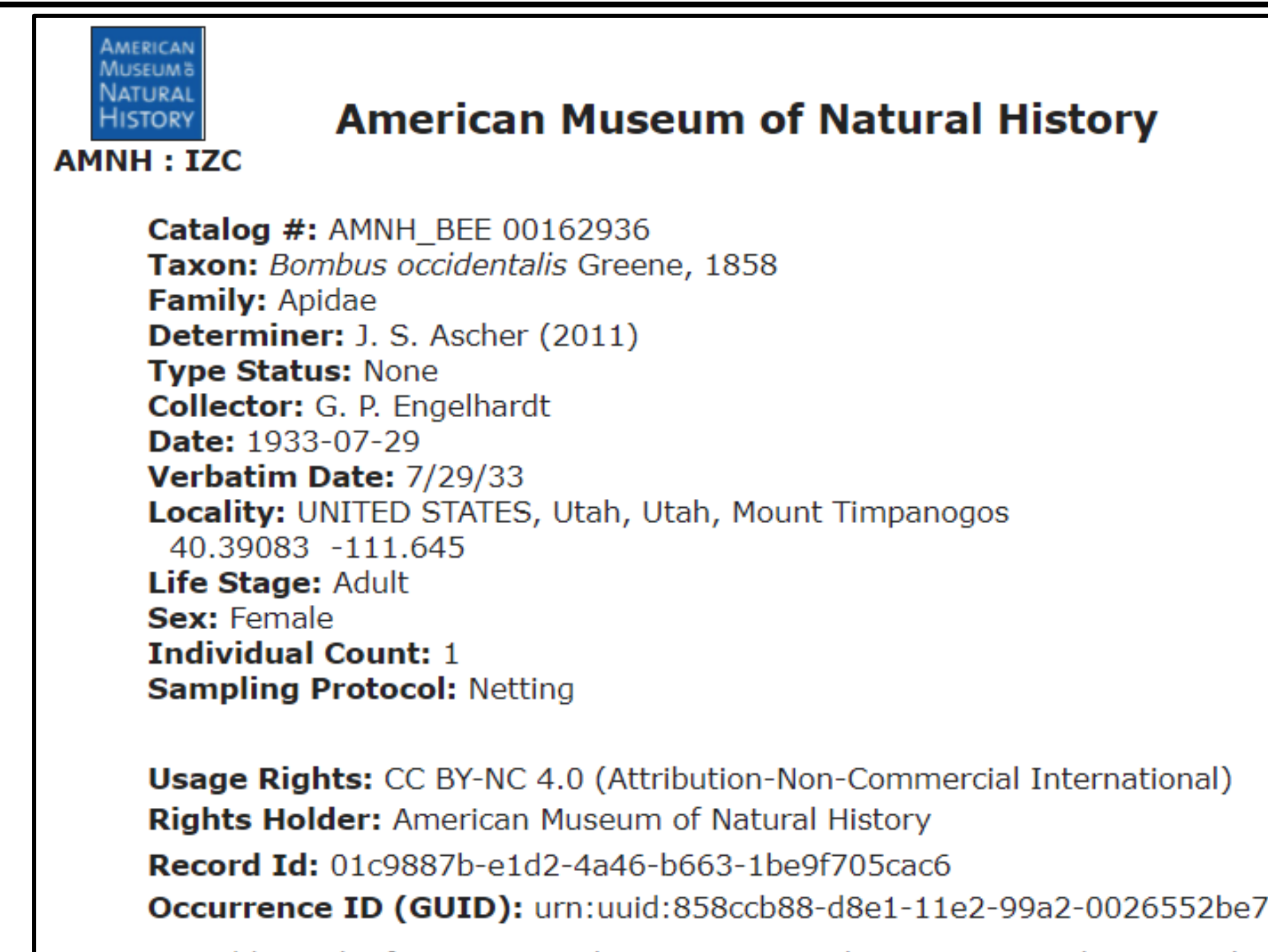


Figure 4: Example historic *Bombus occidentalis* specimens, Mount Timpanogos, 29 July 1933

Future Research

Digitization of entomological collections can provide:

- Species Distributions: *Which species are no longer present that historically occurred here? Are they specialists on a particular plant host species?*
- Seasonality: *At what month was this species in a specific stage?*
- Phenology: *Have the dates of pollinator activities?*

We hope to answer some of the questions we have posed and ones posed by other researchers (Meiners et al. 2020). We also aim to provide information for other scientists to answer questions through the SCAN data portal (Wood et al. 2020).



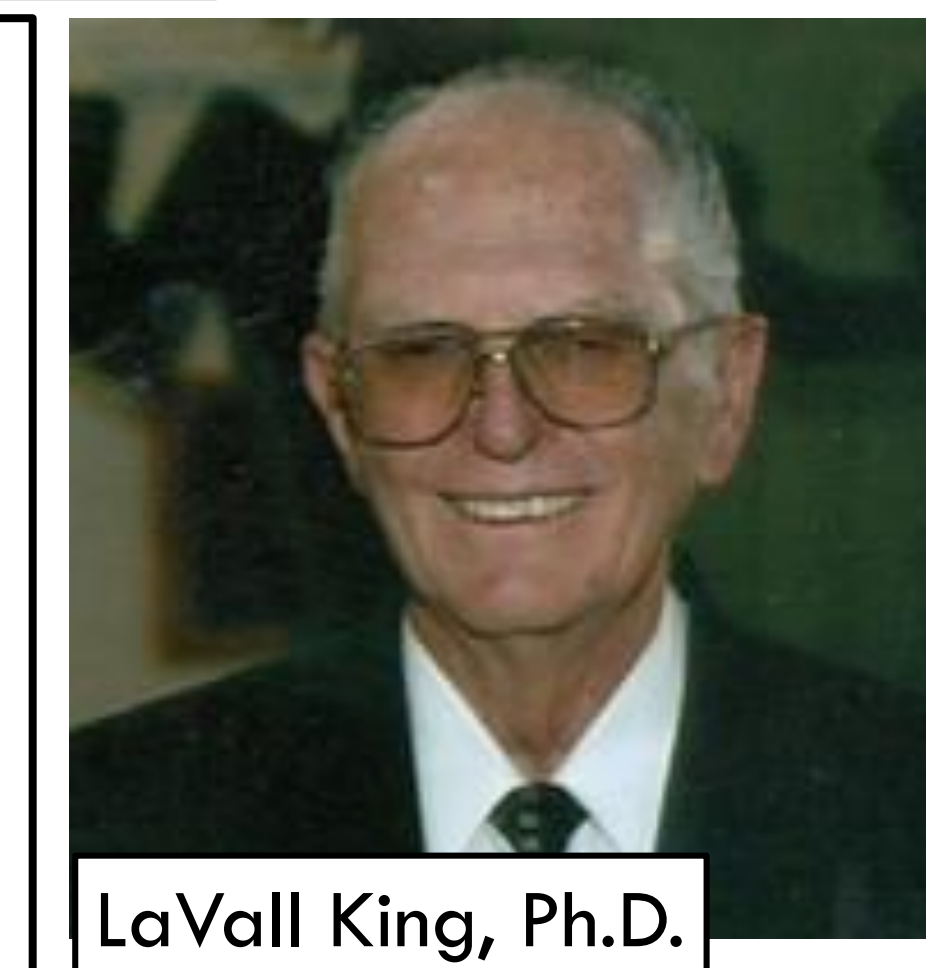
Macro Bee Portraits, Sam Droege, USGS, Patuxent WRS, MD

Literature cited

- Meiners, J. M., Orr, M. C., Kristina, R., Terry, G., & Simonis, J. L. (2020). The influence of data type and functional traits on native bee phenology metrics: Opportunistic versus inventory records. bioRxiv.
- Wood, Z., Thrift, C., Hobson, E., & Seltmann, K. C. (2020). Harnessing the power of digitized natural history collections to visualize spatiotemporal patterns in native and non-native bee flight phenology.

Acknowledgments

- Niel Cobb, Symbiota Collections of Arthropods Network (SCAN) provided valuable information on digitization.
- Amanda F. Barth, Rare Insect Conservation Project Leader, Wildland Resources Dept., USU, provided technical assistance.
- We would like to thank the numerous collectors, especially LaVell King, Ph.D. (Science Faculty Member 1962-1998).



LaVell King, Ph.D.

Further information

- Suggestions are appreciated please email Alexandra Cartwright a02320100@usu.edu
- SCAN website: <https://scan-bugs.org/portal/>
- SEEK app: https://www.inaturalist.org/pages/seek_app
- This poster was presented at the USU Fall Student Research Symposium on Thursday, December 9th, 11 a.m.-12 p.m.