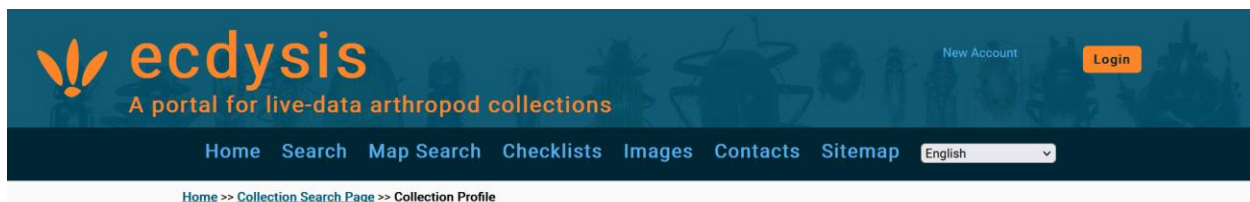


## Exploring Insect Biodiversity with the Luther Entomological Research Collection

*Why are natural history collections, such as the Luther Entomological Research Collection important?*

**Ecdysis** is a portal which uses the **Symbiota** software platform (<https://symbiota.org>), an open-source biodiversity data management system, for live-managing arthropod occurrence data. **Ecdysis** is designed to serve the entomological community as a robust and efficient environment for collections digitization and data-driven research projects. The **ecdysis** community is open to and welcomes all collections and individuals who wish to publish, manage, and analyze arthropod occurrence data - especially in the form of digitized specimens. Luther College provides a data set of our insect collection that is hosted within the Ecdysis portal.



## Luther Entomological Research Collection (LCDI-LERC)

🔍 102 citations    📄 collectors & determiners 5

The Luther entomological research collection, one of the collections of the Hoslett Museum of Natural History at Luther College in Decorah, Iowa, is an important repository of Northeast Iowa insect biodiversity and includes many state record specimens (insect species not previously found in Iowa) not found in the Iowa State University insect collection. The LERC has a unique role specializing in the documentation of insect biodiversity of the driftless region in NE Iowa, SE Minnesota, and SW Wisconsin.

**Contacts:** Kirk Larsen, [larsenkj@luther.edu](mailto:larsenkj@luther.edu)

**Collection Type:** Preserved Specimens

**Management:** Live Data managed directly within data portal

**Global Unique Identifier:** 0a2d1691-227d-402d-82e0-47cdfd569a6f

**DwC-Archive Access Point:** [https://ecdysis.org/content/dwca/LCDI-LERC\\_DwC-A.zip](https://ecdysis.org/content/dwca/LCDI-LERC_DwC-A.zip)

**Live Data Download:** [DwC-Archive File](#)

**Digital Metadata:** [EML File](#)

**Usage Rights:** [CC BY-NC \(Attribution-Non-Commercial\)](#)

**Rights Holder:** Luther College

**GBIF Dataset page:** <http://www.gbif.org/dataset/a0344d4c-1618-4765-9964-595269c8b334>

**Cite this collection:**


Luther Entomological Research Collection. Occurrence dataset (ID: 0a2d1691-227d-402d-82e0-47cdfd569a6f) [https://ecdysis.org/content/dwca/LCDI-LERC\\_DwC-A.zip](https://ecdysis.org/content/dwca/LCDI-LERC_DwC-A.zip) accessed via the Ecdysis Portal, ecdysis.org, 2024-10-23).

### Collection Statistics

- 13,044 specimen records
- 10,036 (77%) georeferenced
- 1,047 (8%) with images (3,686 total images)
- 8,232 (63%) identified to species
- 301 families
- 697 genera
- 1,385 species
- 1,387 total taxa (including subsp. and var.)


This is an example of the digital record of one specimen in the LERC. This record includes **identification information** (including who identified it), **locality information** (i.e. where and when it was collected, sometimes how it was collected, and by whom) including geographic coordinates if at all possible, along with **digital imagery** of the actual specimen that can sometimes allow remote identification. The record also includes a Catalog # which is unique to this specimen.


Details Map Comments Linked Resources

 Luther Entomological Research Collection (LCDI:LERC) Post

**Catalog #:** LCDI-LERC-11776  
**Occurrence ID:** 99c32aae-1ddd-4f75-b617-a0547d3a0c21  
**Taxon:** *Catocala ultronia* (Hübner, 1823)  
**Family:** Erebidae  
**Determiner:** Lena Schmitt  
**Collector:** Lena Schmitt  
**Date:** 2018-07-17  
**Verbatim Date:** 17 July 2018  
**Locality:** United States, Iowa, Winneshiek, Decorah, Spilde Woods; 43.3244 -91.8216  
43.3244 -91.8216  
**Verbatim Coordinates:** 43.3244° N, 91.8216° W

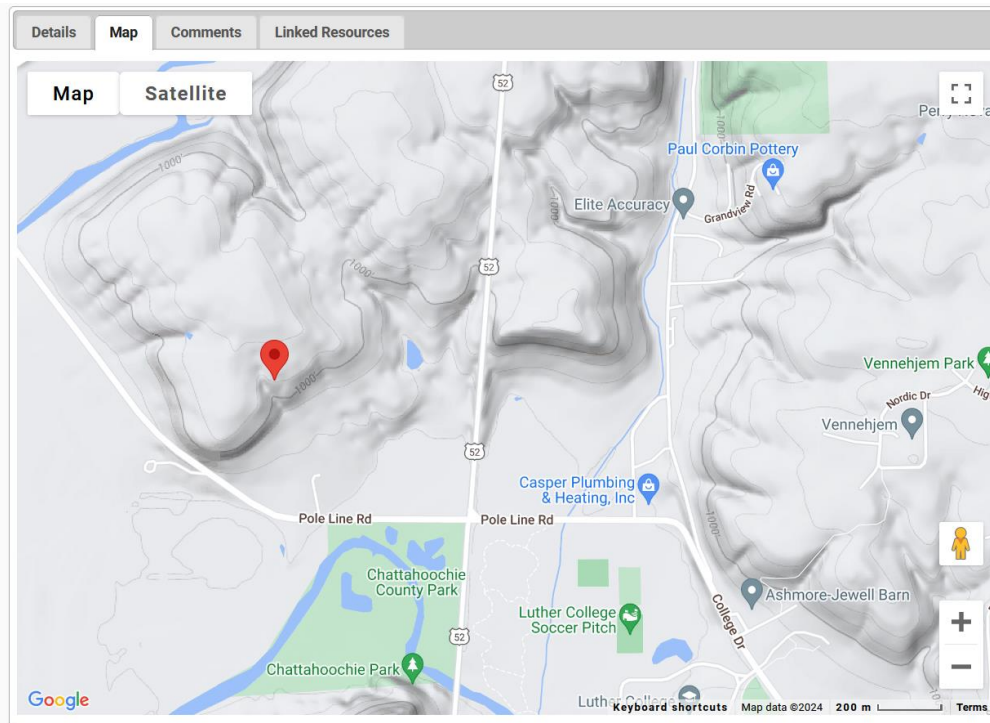
**Specimen Images**

  
[Open Medium Image](#)  
[Open Large Image](#)

  
[Open Medium Image](#)  
[Open Large Image](#)

**Usage Rights:** CC BY-NC (Attribution-Non-Commercial)  
**Rights Holder:** Luther College  
**Record ID:** ce7c2580-03fc-4b09-a8d7-abc0882e64f  
For additional information about this specimen, please contact: Kirk Larsen ([larsenkj@luther.edu](mailto:larsenkj@luther.edu))

A map showing the collection location of this georeferenced specimen record for LCDI-LERC-11776.



This image of the dorsal surface of the actual specimen is also part of the databased record. These images often include the actual locality and identification labels attached to the specimen in the collection, and a tiny 5 mm ruler for size scale.



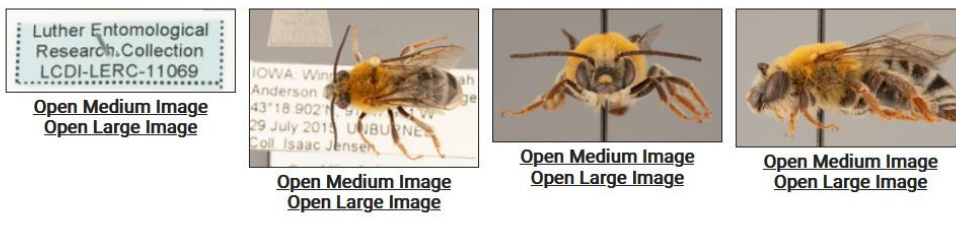
Although the majority of our records currently do not have images associated with them, other specimen records such as this native bee include multiple images depending on the type of specimen.



### Luther Entomological Research Collection (LCDI:LERC)

**Catalog #:** LCDI-LERC-11069  
**Occurrence ID:** ddd53f0e-9aaf-4361-9b3f-ef2c966734d5  
**Taxon:** *Peponapis pruinosa* (Say, 1837)  
**Family:** Apidae  
**Determiner:** Mike Arduser (2022-07-22)  
**Collector:** Isaac Jensen  
**Date:** 2015-07-29  
**Verbatim Date:** 7/29/2015  
**Locality:** United States, Iowa, Winneshiek, Decorah, Anderson Prairie  
 43.31503333 -91.79918333  
**Location Remarks:** Luther College  
**Habitat:** Tallgrass prairie  
**Associated Taxa:** *Verbena stricta*  
**Sex:** male

#### Specimen Images

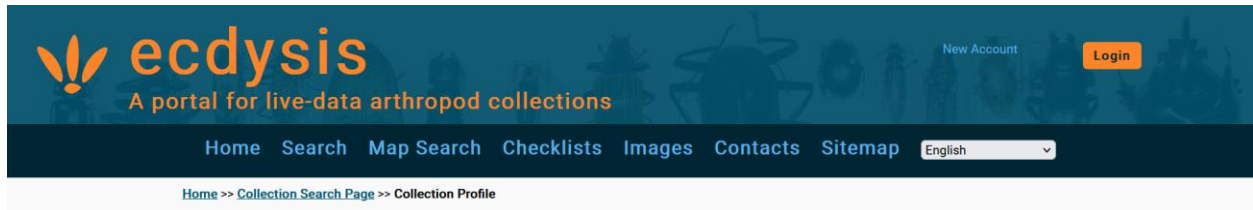


**Usage Rights:** CC BY-NC (Attribution-Non-Commercial)  
**Rights Holder:** Luther College

**Record ID:** 2b55b3b7-f665-4db7-b067-91a4a2871f0c

For additional information about this specimen, please contact: Kirk Larsen ([larsenkj@luther.edu](mailto:larsenkj@luther.edu))

Let's check this out! Using any internet browser, open the ecdysis website at ecdysis.org



**Geographic Distributions.** What is the geographic distribution of species like the endangered rusty patched bumble bee (RPBB): *Bombus affinis*?

click on "Map Search", then "Open Search Panel", then type in the scientific name of the RPBB: "*Bombus affinis*" into the "Taxa:" field. Now hit the "Search" button. *How many records of Bombus affinis are hosted by ecdysis?*

Zoom in on some of the dots in Northeast Iowa. Click on any dot and the "See details", this will show you the data and maybe images of the actual specimen in the Luther College collection. Let's go find that physical specimen in the collection!

Maybe you want to try looking at the geographic distribution of some other species, such as the monarch butterfly: *Danaus plexippus*, the ottoe skipper: *Hesperia ottoe*, or the white underwing moth: *Catocala relictata*.

**Species Checklists.** How many species of insects have we documented to live in Winneshiek County, Iowa? or specifically on the Luther College campus?

From the ecdysis home, click on the "Search" menu in the black band across the top which will list all the collections hosted by the ecdysis portal. We will just look at specimens in collections, so click on the "Specimens" tab. Now click on the black "Search>" button.

Let's first look at insects found in Winneshiek County, Iowa, the county where Luther College is located. On the Search Criteria page, under Locality Criteria in the State/Province field enter "Iowa", and in the County field enter "Winneshiek". Click the "List Display" button.

Every insect in the database in any collection in the portal is listed. How many records (each specimen is a record) have been collected in Winneshiek County, Iowa? In what collections are specimens collected from Winneshiek County found?

Now click the "Species List" tab above. How many taxa are listed for Winneshiek County? *Hint: what's the "taxa count"?*

Let's go back and see how many insect taxa are found in Winneshiek County are found ONLY in the LERC!

Go back to the "Search" menu at the top of the page and click the "Search" menu, and now uncheck the "Select/Deselect all collections" box. Scroll down and check only the "Luther Entomological Research Collection" box, then scroll back up and click the "Search>" button. Re-enter the same Winneshiek county search criteria. How many records from Winneshiek County are found in the LERC? (as compared to other collections?) How many species from Winneshiek County are found in the LERC?

It is a bit more difficult, but we can even see how many species are found on the Luther College campus!

Click the "Map Search" menu at the top of the page, and then click on "Open Search Panel" and a "Search Criteria and Options" panel opens up. On the map now zoom in to find Decorah (get close enough you can easily see all of Luther College land). At the top of the map, click on the



“Draw a Rectangle” button. Now drag the box to cover all Luther College land (this isn’t exact, but is close!). Now click the black “Search” button near the top of the “Search Criteria and Options” panel. The map zooms back out but you can see a circle on the map with a number in it. This is the number of specimen records in the table that appeared in the “Search Criteria and Options” panel. This table contains ALL the specimen records found in the Luther “box” you drew. You can zoom back in on the map to see many of those individual records within the “Luther box”. You can also click on the “Taxa List” tab in the table to see a list of taxa found on the Luther College campus.

Searches within ecdysis are limited to the collections that have data bases hosted by the portal. Let’s do the same thing at a broader scale using ALL digitized collections in the U.S. (maybe North America) from multiple portals (ecdysis is one of many) which are combined together by iDigBio.



**Integrated Digitized Biocollections** (a.k.a. iDigBio) is the national coordinating center for the Advancing Digitization of Biodiversity Collections (ADBC) program funded by the U.S. National Science Foundation (NSF). The purpose of this center is to make data and images of millions of biological specimens in natural history collections available on the web.

Go to <https://www.idigbio.org/>. Click the “Advanced Search” link (not the green “Search” button).

Try **geographic distribution** searches for *Bombus affinis*, *Danaus plexippus*, *Hesperia ottoe*, or *Catocala relictata*. To do this, in the “Search Records” panel, enter the scientific name you are interested in (e.g. *Bombus affinis*) in the “Scientific Name” field under the “Filters” tab (leave the “present” and “missing” boxes unchecked). Zoom in on the map if necessary. *What do you notice is different now compared to your ecdysis searches?*

iDigBio hosts more portals, and you can see more data (from more collections) are a good thing! They help us get a clearer idea of the distribution of biodiversity across the landscape.

**Changing geographic distribution patterns.** Other searches can be done to see changes in geographic distribution patterns of a species over time.

iDigBio allows us to search for some different criteria than ecdysis. Let’s see what has happened to the geographic distribution of *Bombus affinis* over time.

In the “Search Records” panel, in the Scientific Name panel type “*Bombus affinis*”. Leave the “present” and “missing” boxes unchecked.

Use the zoom features on the map to zoom in on the dots representing individual records. You’ll notice a few stray records in Missouri and points farther to the southwest, these likely have some type of error as they are outside the historic known range for this species. Where are most of the dots clustered? This is the historic range of *B. affinis*. *How many records of Bombus affinis are hosted by iDigBio?*

We will now start to look at the geographic distribution of this species over time. The oldest record of *Bombus affinis* is from 1881. Let’s start with 1925 and look at changes in the range of *Bombus affinis* over 25 year periods.

In the date collected panel, in the Start we can enter dates in yyyy-mm-dd format. Enter the “Start” date as 1925-01-01 , and the “End” date to 1950-01-01. (once again leave the “present” and “missing” boxes unchecked!). *How has the geographic distribution changed from when we had not specified a date range?*

Change the “start” date now to 1950-01-01 as the start date, and 1975-01-01 as the end date. *What has happened?* Repeat this again with 1975-01-01 as the start date, and 2000-01-01 as the end date. *What has happened?*

Try one final 25 year period, change the “start” date now to 2000-01-01 as the start date, and 2025-01-01 as the end date. *What has happened?*

*Can you understand why the U.S. Fish & Wildlife Service declared this species as endangered in 2017?*



**GBIF**—the **Global Biodiversity Information Facility**—is an international network and data infrastructure collaboratively funded by the world's governments and aimed at providing anyone, anywhere, free and open access to data about all types of life on Earth. Our Luther data can also be found at <https://www.gbif.org/> as GBIF includes iDigBio and multiple other larger data sets, as GBIF now has over 3 BILLION occurrence records!

Let's see what we can find out about *Bombus affinis* when using GBIF!

Click on the “Get data” menu at the top, then “Occurrences”. In the “Scientific name” dropdown start to enter “*Bombus affinis*” in the “Search” space and select “*Bombus affinis* Cresson, 1863”. *How many records of Bombus affinis are hosted by GBIF?*

A table with all the *Bombus affinis* records for all digitized collections in the world is now produced, and you can click on any record to see where and when the specimen was collected, etc. The number of records is different than iDigBio because GBIF hosts more collection data sets than iDigBio which hosts more collection data sets than ecdysis. Many collections may be international and might house specimens previously collected in the U.S.

In the “Occurrences” panel, in the “Search” area, simply enter “Winneshiek” and this will narrow down the records of *Bombus affinis* either in a collection or observations reported on BugGuide or iNaturalist found in Winneshiek County.

Exercise created by:  
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