Exploring the iNaturalist Database and Understanding Species Information

Overview

There are four activities in this guide. The first two activities are a tutorial on how to navigate iNaturalist using the search and filter functions. The third activity walks you through exploring detailed species information on iNaturalist. The fourth activity describes all the information that can be found within an observation on iNaturalist. In addition to this guide, you may also find it helpful to reference the iNaturalist Getting Started Guide.

1. General exploration of biodiversity	5 - 10 minutes
2. Exploration of observations within a project	5 - 10 minutes
3. In depth species exploration	15 minutes
4. Exploring information about observations	5 - 10 minutes

Objectives

- Use the search and filter functions on iNaturalist
- Explore regional biodiversity
- Explore data within a project
- Explore species information
- Explore details within observations

Materials

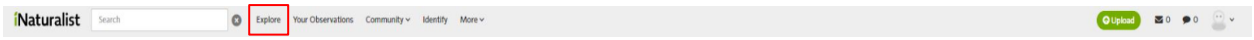
- Internet browser
- iNaturalist account (optional)

Total activity time **30 - 45 minutes**

Doll, J., Baboi, M., Vamosi, J., Summers, M., Albor, C. (2024). Exploring the iNaturalist Database and Understanding Species Information. QUBES Educational Resources.

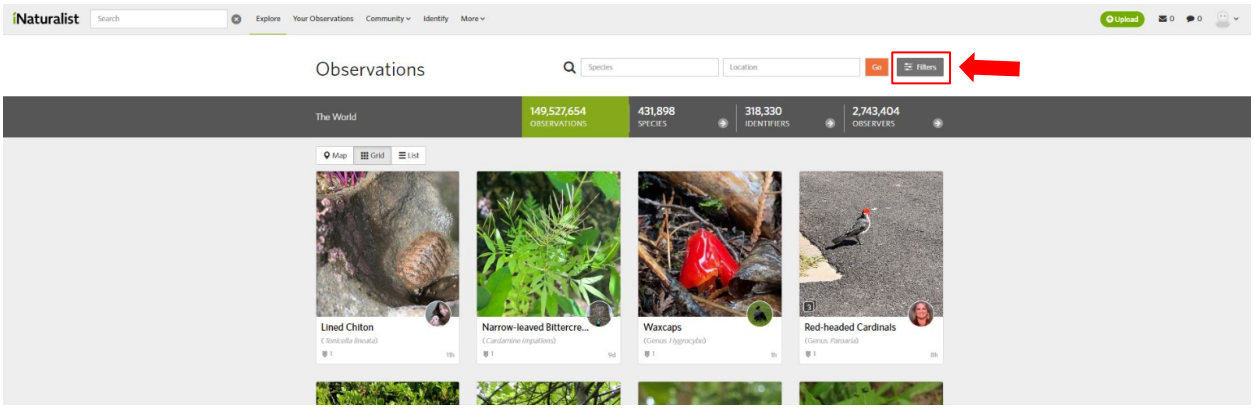
Activity 1. General exploration of biodiversity:

At the top of your screen, press the “Explore” button.



This will present you with a screen containing every single observation, species, observer, and identifier on iNaturalist. These are the unfiltered results, with flora and fauna observations from around the world. Seeing such a large amount of data can be overwhelming and disorienting, especially for unpracticed users. However, you can use the filter function to narrow down your results.

To begin filtering, press the “Filter” button at the top right of your screen.



Using this filter, you can sort by date added/observed, research grade/verifiable observations, category (plant, insect, mammals, etc.). Next to the filter button is the “Location” button, which allows you to narrow down your observations to specific locations. You can search in “Species” for higher level taxonomic units to help narrow down your search. For example: Insects (Class Insecta), Butterflies and Moths (Order Lepidoptera), Swallowtails and Parnassians (Family Papilionidae).

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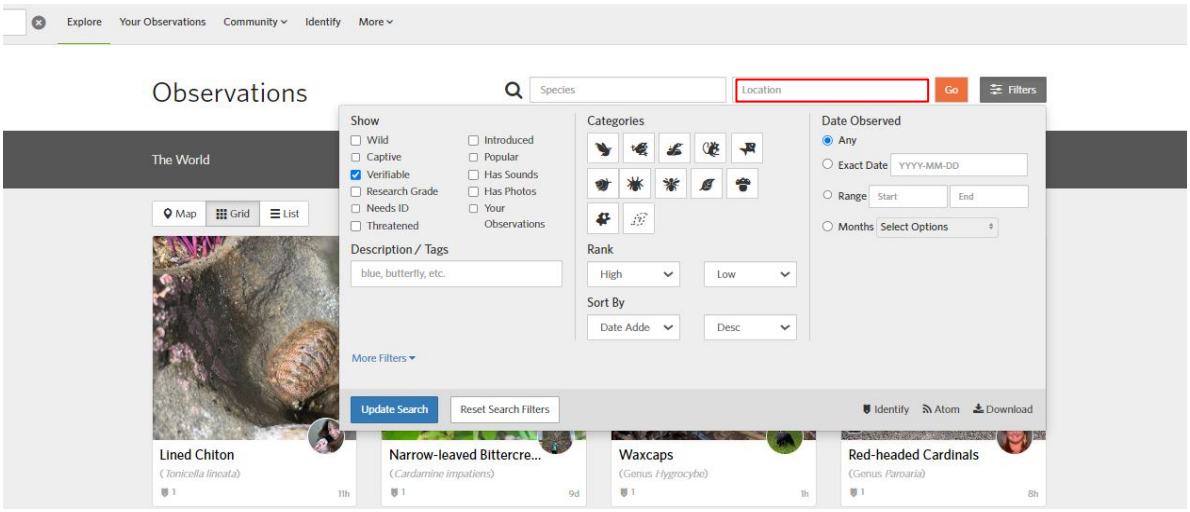
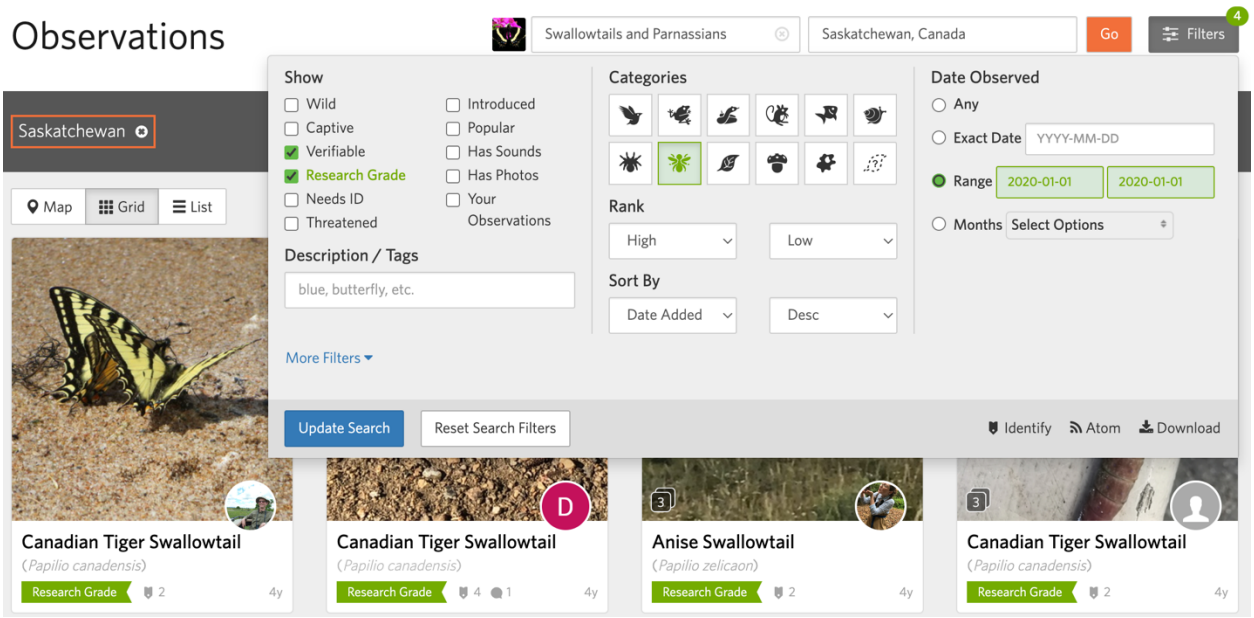


Example 1) I would like to know more about Swallowtails and Parnassian butterflies observed in Saskatchewan in 2020. Here are the search parameters I used.

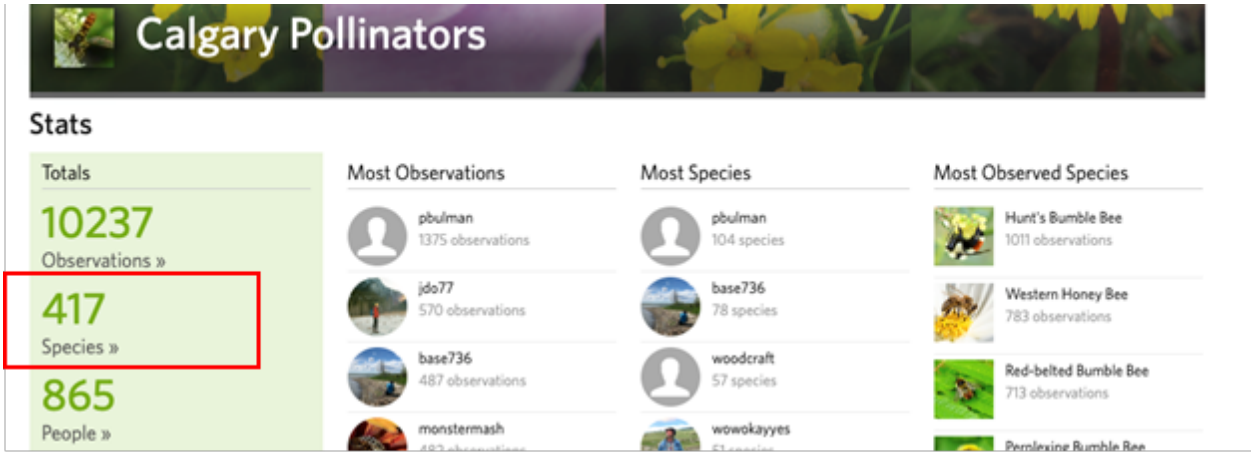


Doll, J., Baboi, M., Vamosi, J., Summers, M., Albor, C. (2024). Exploring the iNaturalist Database and Understanding Species Information. QUBES Educational Resources.

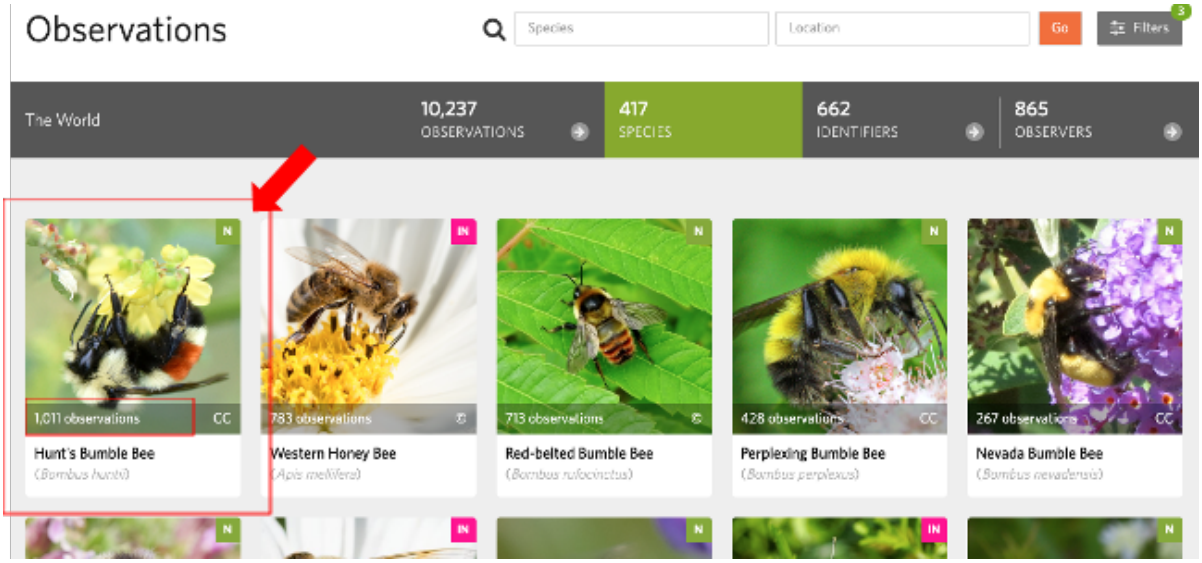
Activity 2. Exploration of observations within a project

Now that you know how to sort by general observations, let us look at how to navigate and explore in depth genus or species information within a project. You can do this with any project of your choosing, but for this guide we will be exploring species within the Calgary Pollinators Project.

Go to the “Community” button at the top of your screen and click on the “Calgary Pollinators Project.” If you are not a member of the project already, you may search for it in the search bar. Click on “Species” – this will take you to a page with every species included in the project.



Take some time to explore the varied species within the project. You will see a collection of all the species in the project and how many observations have been made for each species.



You can click on the number of observations if you would like to view the individual observations made for that species. You can click on the name of the species to see more information about that insect. If you are interested in a certain Family or Order of insects, you can use the filter function to see specific taxonomic groups.

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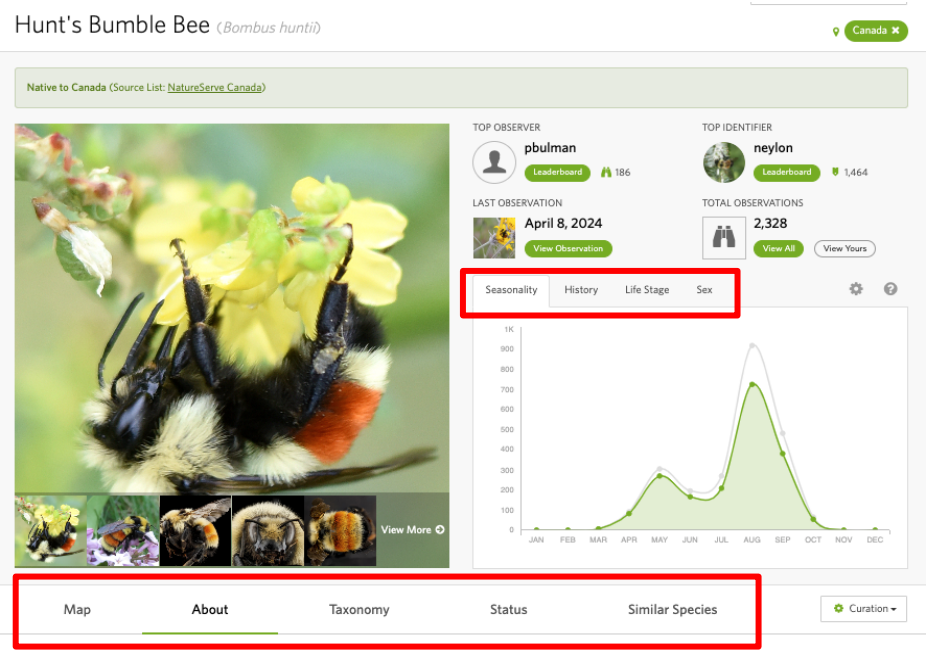
Activity 3. In depth species exploration

When you have found a species of insect that you would like to know more about, click on the name or picture of your species of interest. You will be presented with a page containing information about your species. This includes the following:

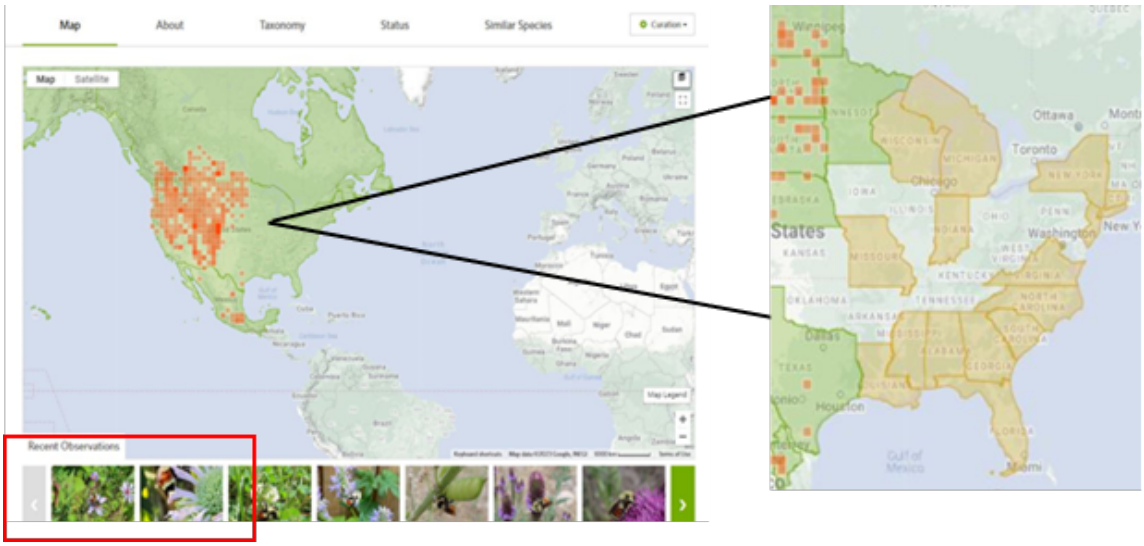
- Species distribution
- Wikipedia description
- Taxonomy
- Status
- Similar species
- Seasonality
- History
- Life Stage
- Sex



A brief description of each section that is available on the species page is detailed below. It is recommended you explore some species information before working with your dataset. Knowing about the natural history and distribution of individual species can help with generating questions or interpreting data analyses. Click on the hyperlinks above to jump to information about each section.

3.1. Species Distribution (Map)

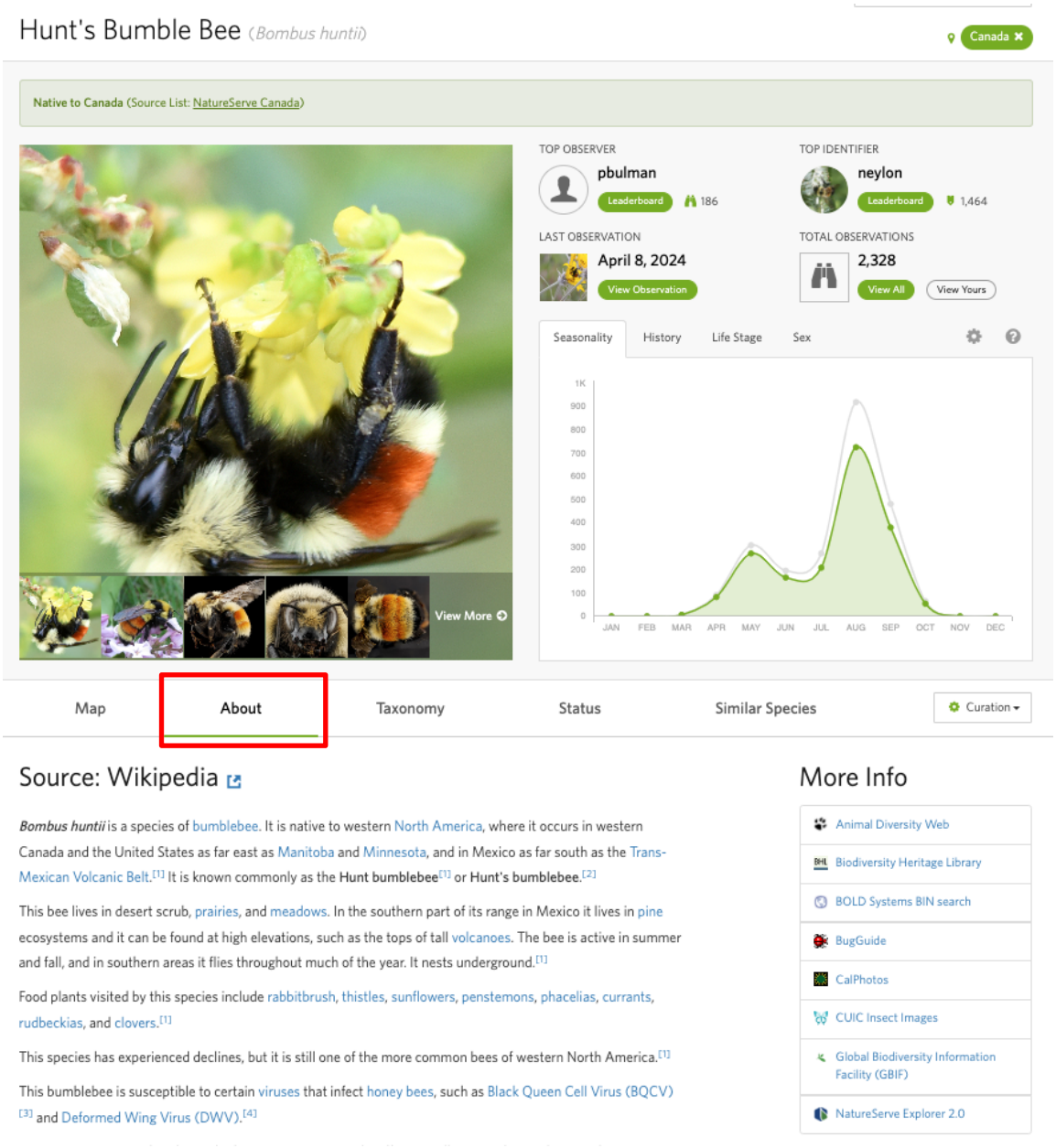
This includes an interactive world-wide map showing where your chosen species has been observed by iNaturalist users. The darker red portions on the map are the locations where the species is most observed. When you zoom in, these will become individual points – you can click on them to view the observations. You may notice that some portions of the map are highlighted in orange. The orange highlight indicates that the species is expected to be present in that location, but no observations have been confirmed yet.



At the bottom of the map are recently uploaded observations of the species. By clicking on a picture and clicking on it again, it will take you to the individual observation page.

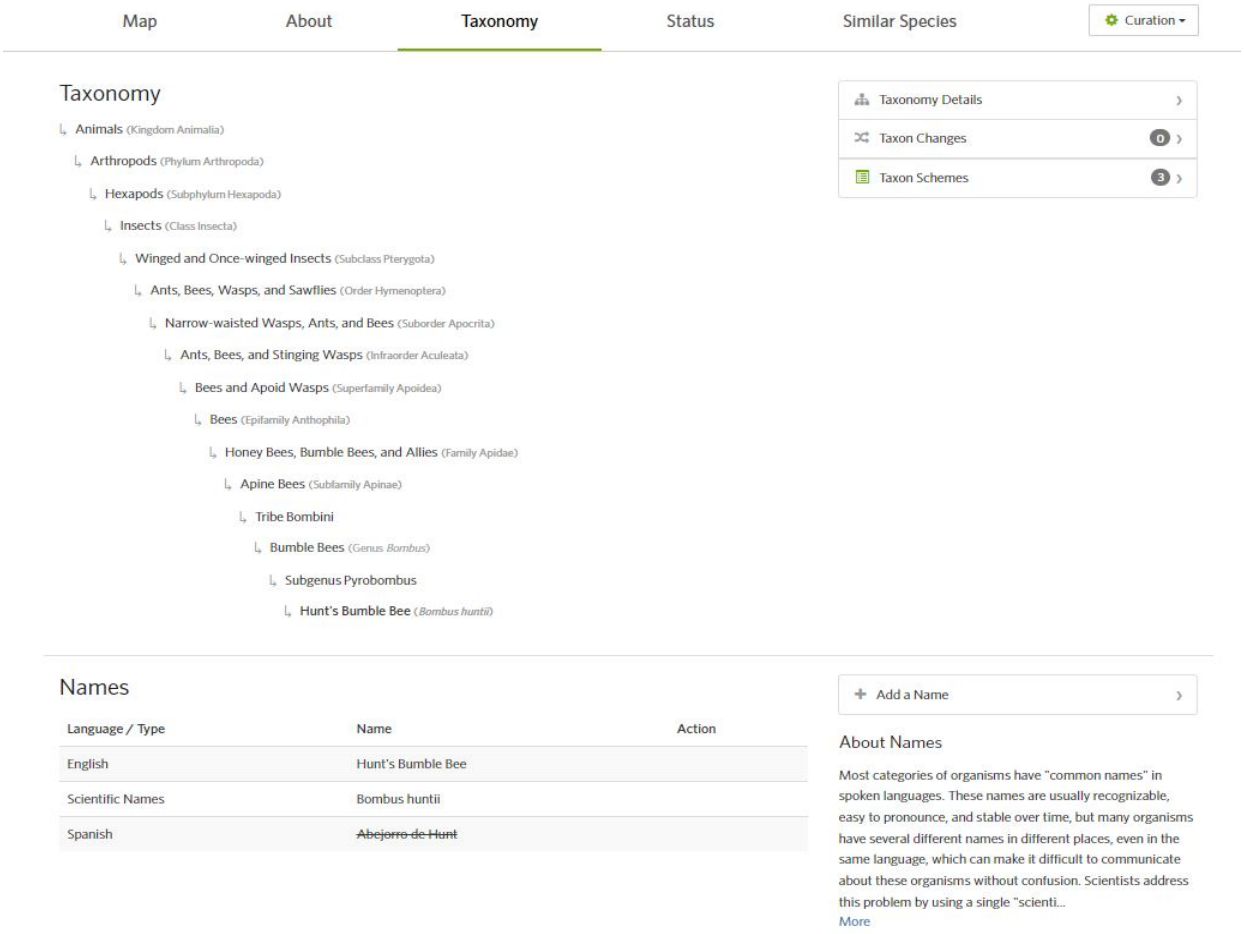
3.2. Wikipedia Description (About)

The Wikipedia section pulls information available on Wikipedia. Information might include distribution and habitat, common names, preferred foods, and interactions with other organisms.



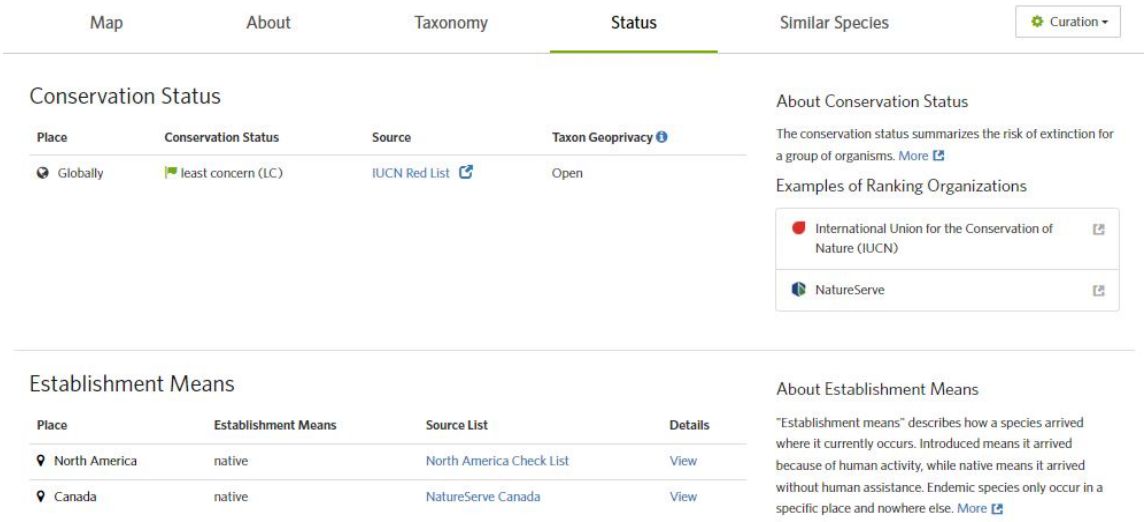
3.3. Taxonomy

Includes the detailed taxonomy for the species, as well as the common (English) name and the scientific name.



3.4. Status

Based on the IUCN Red List, this section includes the species' global conservation status (see table below for a description of IUCN status). It also includes the establishment means, which is how a species arrived in the examined country or continent. Species establish means include "introduced", "native", and "endemic."



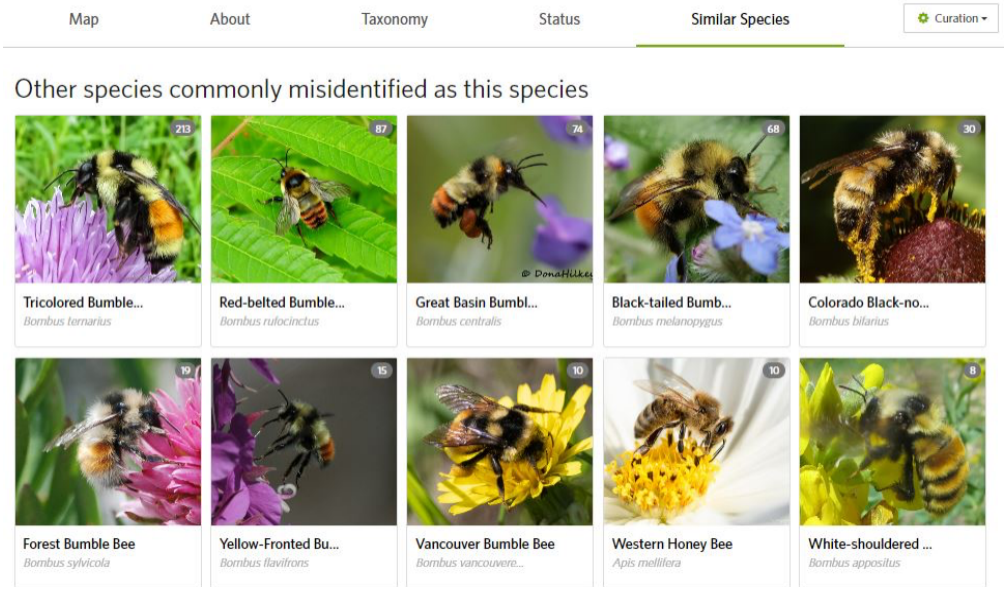
The IUCN Red List denotes 9 categories as it relates to a species conservation status (Bland et al., 2017):

Conservation Status	Description
① **Not Evaluated (NE)**	A taxon that has not been evaluated against any of the criteria.
② **Data Deficient (DD)**	A taxon that has inadequate data about its distribution or population status, even if its biology is well studied.
③ **Least Concern (LC)**	A taxon evaluated using the criteria for **Critically Endangered (CR), Endangered (EN), Vulnerable (VU)**, and **Near Threatened (NT)** but does not qualify for these categories.
④ **Near Threatened (NT)**	A taxon that has been evaluated using the criteria for **Critically Endangered (CR), Endangered (EN),** and **Vulnerable (VU)**, but does not qualify for these

	categories. It has a high risk of qualifying as threatened in the future.
⑤ **Vulnerable (VU)**	A taxon that is still found in the wild but has a high risk of extinction.
⑥ **Endangered (EN)**	A taxon that is still found in the wild but has a high risk of extinction.
⑦ **Critically Endangered (CR)**	A taxon that is still found in the wild but has a high risk of extinction.
⑧ **Extinct in the Wild (EW)**	A taxon is found only in captivity or a naturalized population and can only survive while being cultivated. To confirm that individuals no longer exist in the wild, exhaustive surveys have been done of the species' habitat following its time of activity and reproductive life cycle.
⑨ **Extinct (EX)**	The last individual of a species is believed to have died, without reasonable doubt. To ensure this, exhaustive surveys have been done of the species' habitat following its time of activity and reproductive life cycle.

3.5. Similar Species

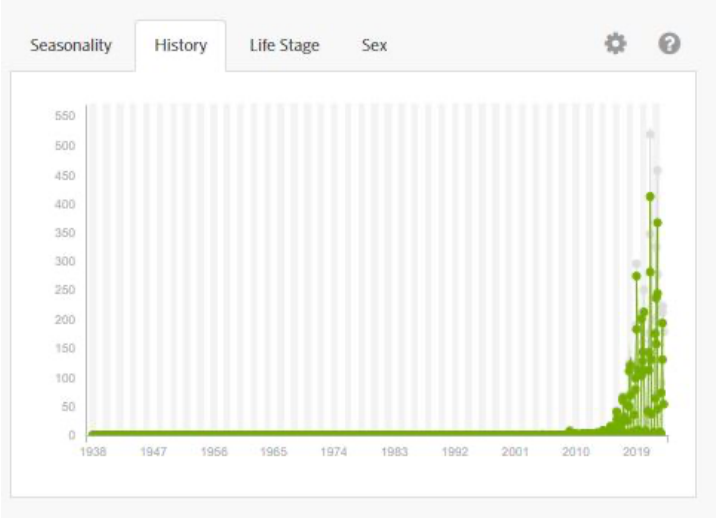
This includes species that are visually similar to your chosen species. Some of the species could be ones that are commonly misidentified as your species.



3.6. Seasonality

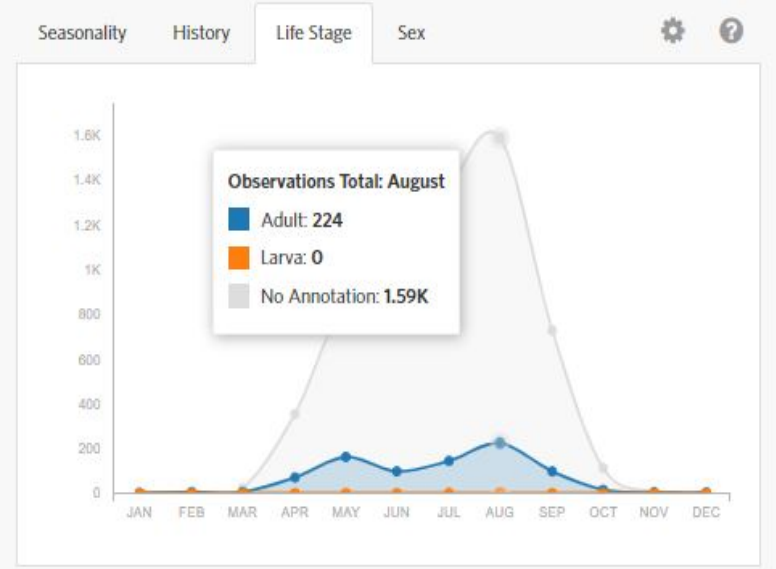
Seasonality is shown as a chart that compiles the number of observations of your species (y-axis) and organizes them based on month (x-axis). Be aware that this chart is showing when people make observations of this species and does not fully represent when the chosen species is active. Even if a species appears to be more present in a certain month, it might be because more people are making observations in that month.

For example, *Bombus huntii* is most commonly observed in August, with about 1500 Research Grade observations being recorded in August.



3.7. History

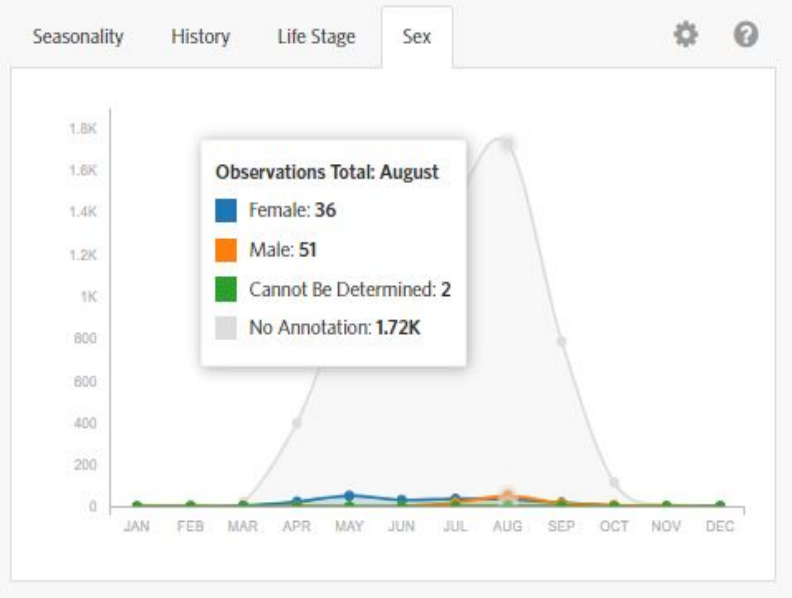
This section shows a chart of all the observations of your taxon over time. Again, note that this chart is prone to bias based on when people make observations. It shows the number of times that species has been observed.



3.8. Life Stage

This chart shows at what life stage the observation was made for each month. For insects, there are three categories: (1) Larva [orange]; (2) Adult [blue]; (3) No Annotation [gray]. These

categories will differ based on the organism you are looking at and their specific life stages. Most groups of organisms (mammals, birds, insects, etc.) will have life stage. For example, plants will have plant phenology describing: (1) Flowering; (2) Flower Budding; (3) Fruiting; (4) No Evidence of Flowering; or (5) No Annotation

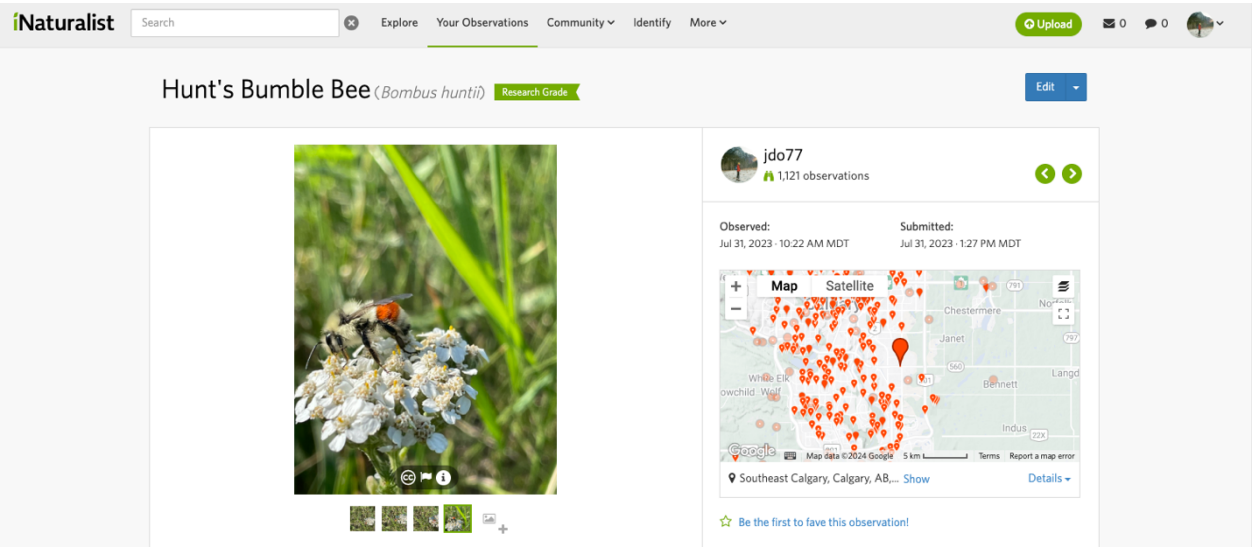


3.9. Sex

This chart shows the sex associated with the taxon observations. There are four categories: (1) Male [orange]; (2) Female [blue]; (3) Cannot be Determined [green]; (4) No Annotations [gray].

Activity 4. Exploring information about an observation

This activity describes all the information that can be found within an observation on iNaturalist. On each observation page, you can find photos of the organism being observed/identified, a map with the general location of the observation, the date it was observed, and the date the observation was submitted.



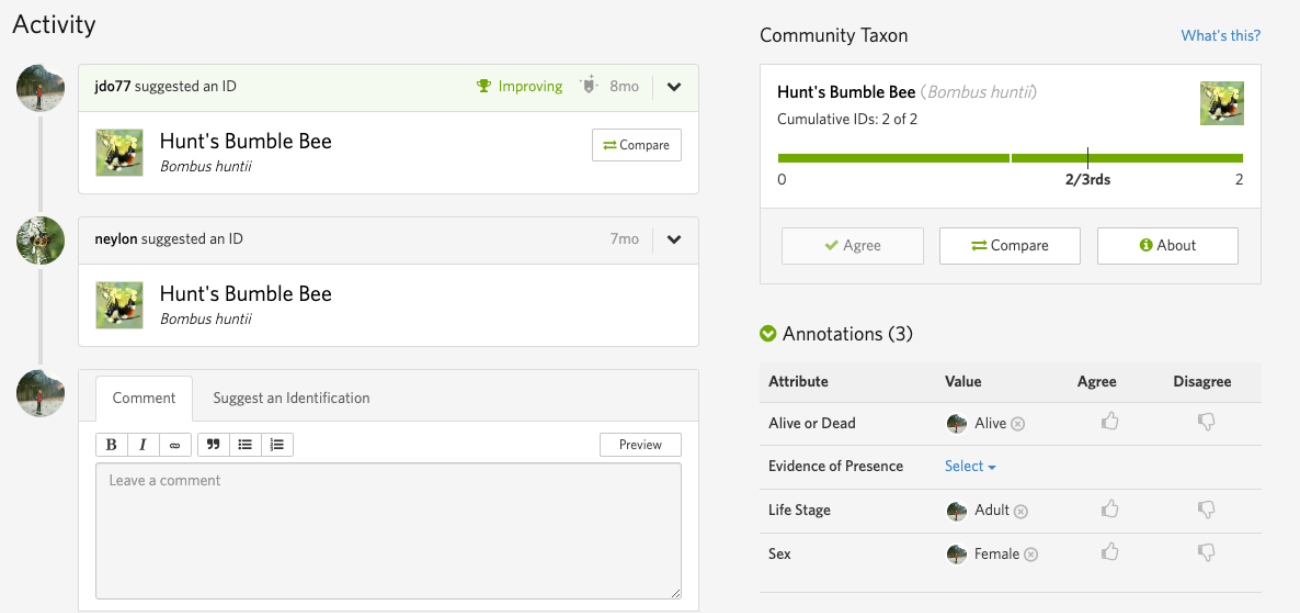
Observations will also include the following information:

- Activity
- Community Taxon
- Annotations
- Projects
- Tags
- Observation Fields
- Top Identifiers
- Copyright Info
- Data Quality Assessment

A brief description of each of these sections is detailed below. Click on the hyperlink above to jump to information about that section.

4.1. Activity

The activity section will show the suggested IDs of the observation and any comments on it. Observation IDs can be withdrawn and updated as more people make suggestions.



4.2. Community Taxon

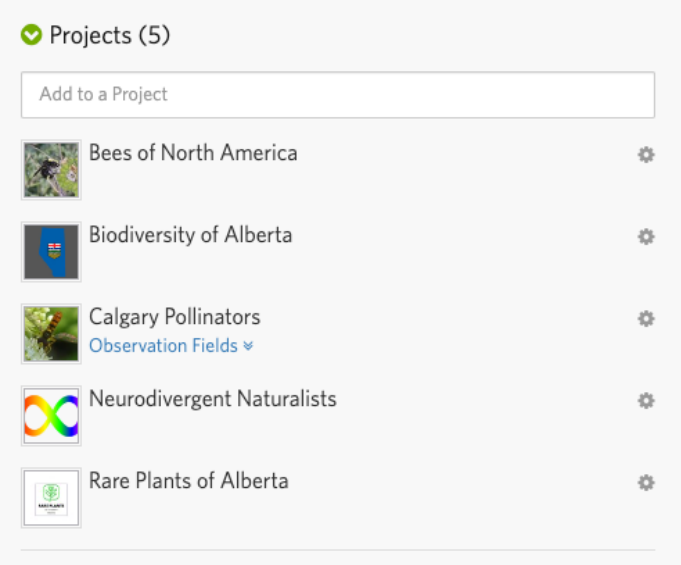
The community taxon on iNaturalist refers to the species identification agreed upon by the community of users for a particular observation. It represents the most accepted identification based on the input of multiple users who review and contribute to the identification.

4.3. Annotations

Annotations allow you to add extra attributes about your observations such as: if the specimen is alive or dead; if there is evidence of other things like galls, animal tracks, eggs, etc.; the life stage of the organism; and the sex. The annotation attributes will vary depending on the type of organism you are looking at, and how much information the observer has contributed. For example, an observation of a plant could have a plant phenology attribute.

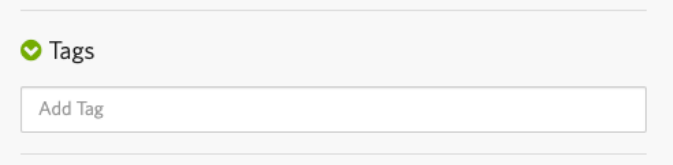
4.4. Projects

Projects on iNaturalist are collections of observations centered around a particular theme, location, or goal. Users can join projects and contribute their observations to them, helping to build datasets for research, conservation, or simply shared interest.



4.5. Tags

Tags on iNaturalist are labels that users can assign to their observations to help categorize them or provide additional context. Tags can include information about habitat, behavior, or any other relevant details.



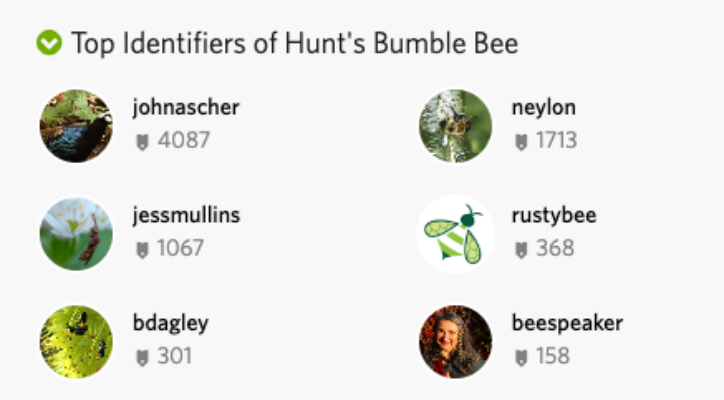
4.6. Observation Fields

Observation fields are customizable data fields that users can add to their observations to collect specific information beyond what is provided by default. These fields can be used to gather additional details about the observation, such as measurements, habitat type, or other relevant information.

Observation Field “Visited flower of” is helpful when you want to see interactions between plant and pollinator species. You can also add the associated observation of the plant that a pollinator is visiting or vice versa.

4.7. Top Identifiers

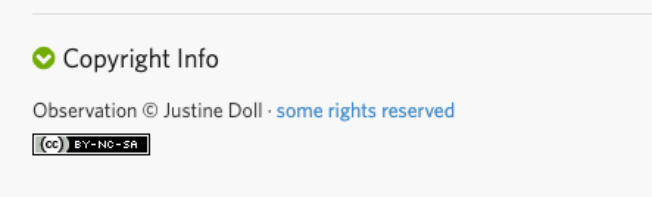
Top identifiers are users who are particularly skilled or active in identifying observations on iNaturalist. They are often recognized for their expertise and contribution to the community by providing accurate identifications for a wide range of observations.



4.8. Copyright Info

Copyright information on iNaturalist refers to the usage rights and restrictions associated with the content uploaded to the platform. Users can specify the copyright status of their observations and any associated media to ensure that their intellectual property rights are respected.

You can help contribute to open science data, such as the Global Biodiversity Information Facility (GBIF), an international organization collating and disseminating biodiversity data globally, by setting your licensing preferences to: No Copyright (CC0), Attribution (CC BY), and Attribution-NonCommercial (CC BY-NC). You can update your licensing options by going to your 'Account Settings,' selecting 'Content and Display,' and scrolling down to 'Licensing.' You can choose different licensing preferences for your observations, photos, and sounds.



For example, a licensing preference for observations set to "Attribution-NonCommercial", which means other people or organizations can use data from the observations non-commercially, if they give credit. Photo and sound licensing set to "Attribution-NonCommercial-ShareAlike" means other people can use the photos or sounds non-commercially if they credit and share under the same licensing terms.

4.9. Data Quality Assessment

Data quality assessment on iNaturalist involves the evaluation of the accuracy and reliability of observations. This can include factors such as the completeness of observation details, the quality of accompanying media, and the consensus of community identifications.

Data Quality Assessment

Quality Grade: Research

Casual — Needs ID — **Research Grade**

The Quality Grade summarizes the accuracy, precision, completeness, relevance, and appropriateness of an iNaturalist observation as biodiversity data. Some attributes are automatically determined, while others are subject to a vote by iNat users. iNaturalist shares licensed "Research Grade" observations with a number of data partners for use in science and conservation.

This observation is Research Grade! It can now be used for research and featured on other websites

Research Grade Qualification	Yes	No
Date specified	✔	
Location specified	✔	
Has Photos or Sounds	✔	
Has ID supported by two or more	✔	
Date is accurate	✔ 👍	👎
Location is accurate	✔ 👍	👎
Organism is wild	✔ 👍	👎
Evidence of organism	✔ 👍	👎
Recent evidence of an organism	✔ 👍	👎
1 Evidence related to a single subject	✔ 👍	👎
Community Taxon at species level or lower	✔	

Based on the evidence, can the Community Taxon still be confirmed or improved?

☐ Yes ☐ No, it's as good as it can be

This observation is featured on 1 site

GloBI

References

Bland, L. M., Keith, D. A., Miller, R. M., Murray, N. J., & Rodríguez, J. P. (2017). Guidelines for the application of IUCN Red List of Ecosystems Categories and Criteria, version 1.1. International Union for the Conservation of Nature, Gland, Switzerland.