

Update on the Beecology Bumblebee Participatory Science Project at NH Audubon's McLane Center

By Ellie Peabody

This article provides an update on the Beecology bumblebee participatory science project at NH Audubon's McLane Center, first introduced in the Summer 2024 issue of *Afield*.

Bumblebee data collection was in full swing during the 2024 garden season at the McLane Center's Pollinator Gardens, contributing to the Beecology bumblebee-plant interaction research project. This initiative aims to study native bumblebee ecology and understand the critical relationships between bumblebees and the flowers they rely on. With over **400 video observations** uploaded to the Beecology web-based app in 2024, the newly generated reports reveal a **diverse bumblebee population** and the **flower preferences** they rely on to sustain their species.

Why Study Bumblebees?

Native bumblebees (genus *Bombus*) are vital pollinators that depend on **nectar for food** and **pollen for reproduction**. However, their populations are declining. Through participatory science (also called citizen or community science), the Beecology Project gathers data to investigate the causes of this decline by documenting bumblebee species and the plants they visit for nectar and pollen.

As **keystone species**, bumblebees play a pivotal role in ecosystems. By pollinating flowers, they enable the plants to produce seeds and fruits—critical food sources for other wildlife. Without native bumblebees, entire ecosystems and food chains are at risk. For more information on how to support bumblebees, visit the [Beecology Project's website](#).

Collecting Data in 2024

Observations for the Beecology Project consist of **10-second videos** capturing bumblebees interacting with flowers. Each video includes clear views of the bee's **head, thorax, abdomen, and side profile**, along with the flower species. These videos are then uploaded to the Beecology web-based app for analysis.

Despite some challenges—such as **wind, rain, extreme heat**, and periods when bumblebees were absent—2024 marked the **second year** of contributing data to the project. A summary of all observations for the 2024 season is displayed in **Figure 1**, while **Figure 2** provides a comparison of monthly observations by species for **2023 and 2024**, capturing both **pollen** and **nectar** foraging behaviors.

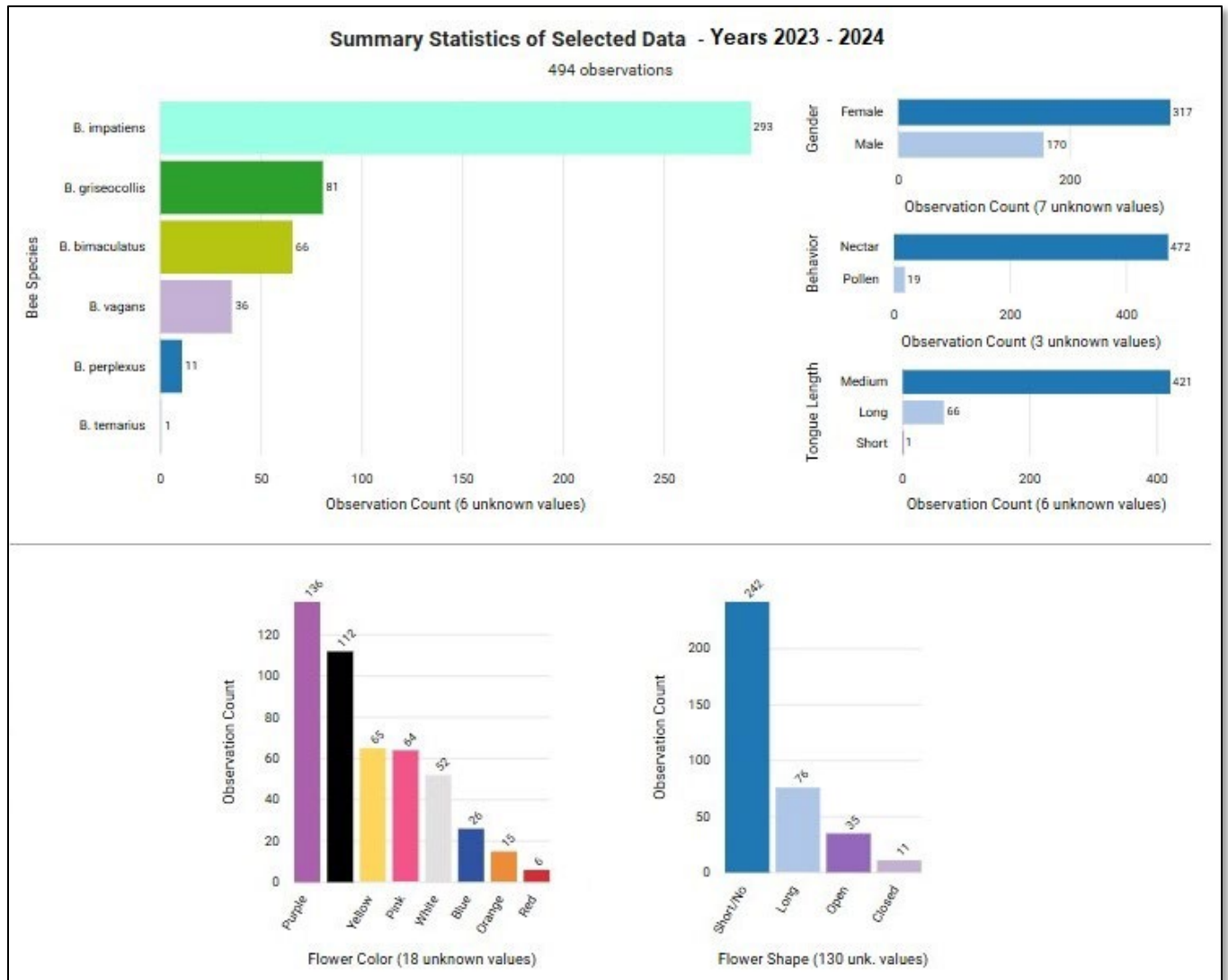


Figure 1. Summary of observations 2023-2024 at the New Hampshire Audubon McLane Center. Source Beecology website, data analysis tools.

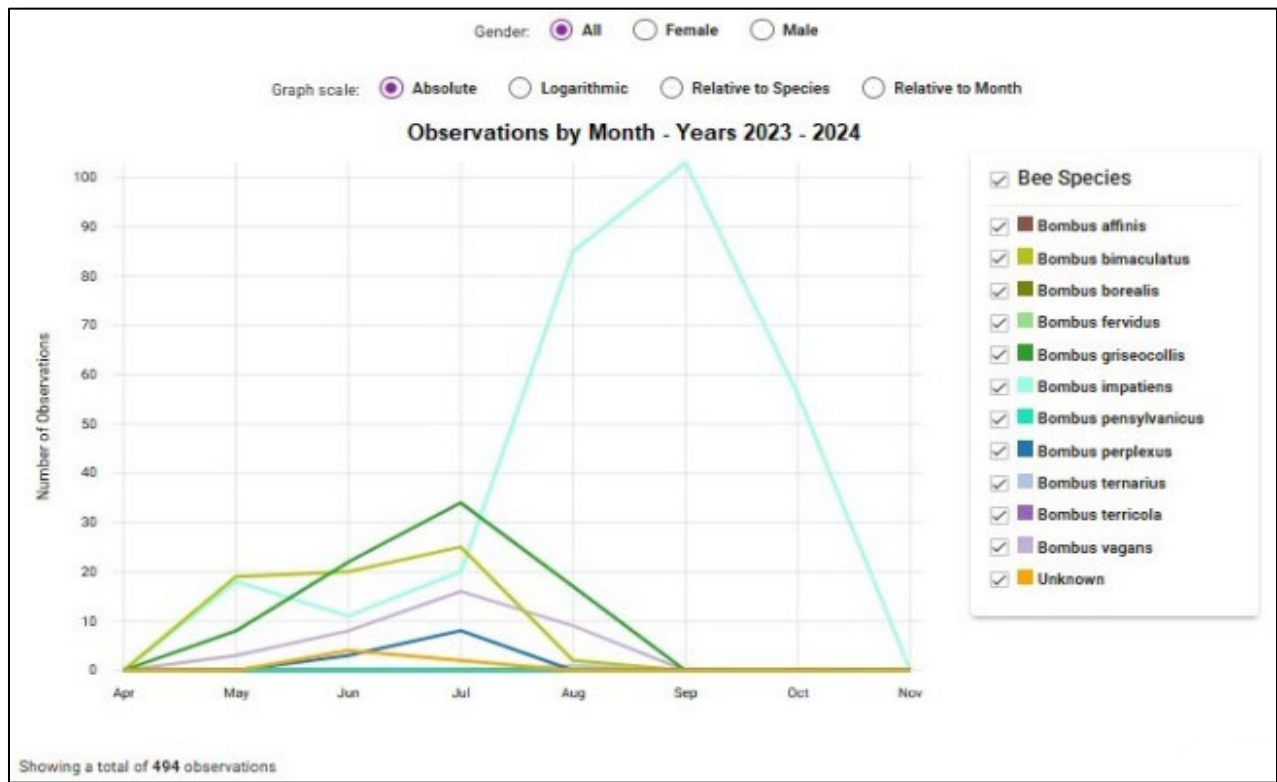


Figure 2. Observations of bumblebee species per month 2023-2024 at the New Hampshire Audubon McLane Center. Source Beecology website, data analysis tools.

Analyzing the Data

The collected data allows for analysis across multiple categories, including:

- **Flower characteristics** (color, shape, species)
- **Bee behavior** (foraging habits, nectar vs. pollen collection)
- **Species traits** (tongue length, gender)
- **Seasonal activity** (visits by month)

One species of particular interest is **Bombus vagans**, a medium-tongued bumblebee listed as **at risk** in Beecology's [suggested plant list](#).

Figure 3 highlights the plants and their flower colors that *Bombus vagans* relied on for both nectar and pollen. Notably, the **Virginia rose (*Rosa virginiana*)**—a native perennial added to the gardens in 2023—began flowering in 2024 and provided the **only observed pollen source** for *B. vagans*. Additionally, an **annual sage plant** from the **Containers for Pollinators** project, located along the garden walkway, provided an extra nectar source. This finding emphasizes that **container gardens** can also play a meaningful role in supporting pollinators.

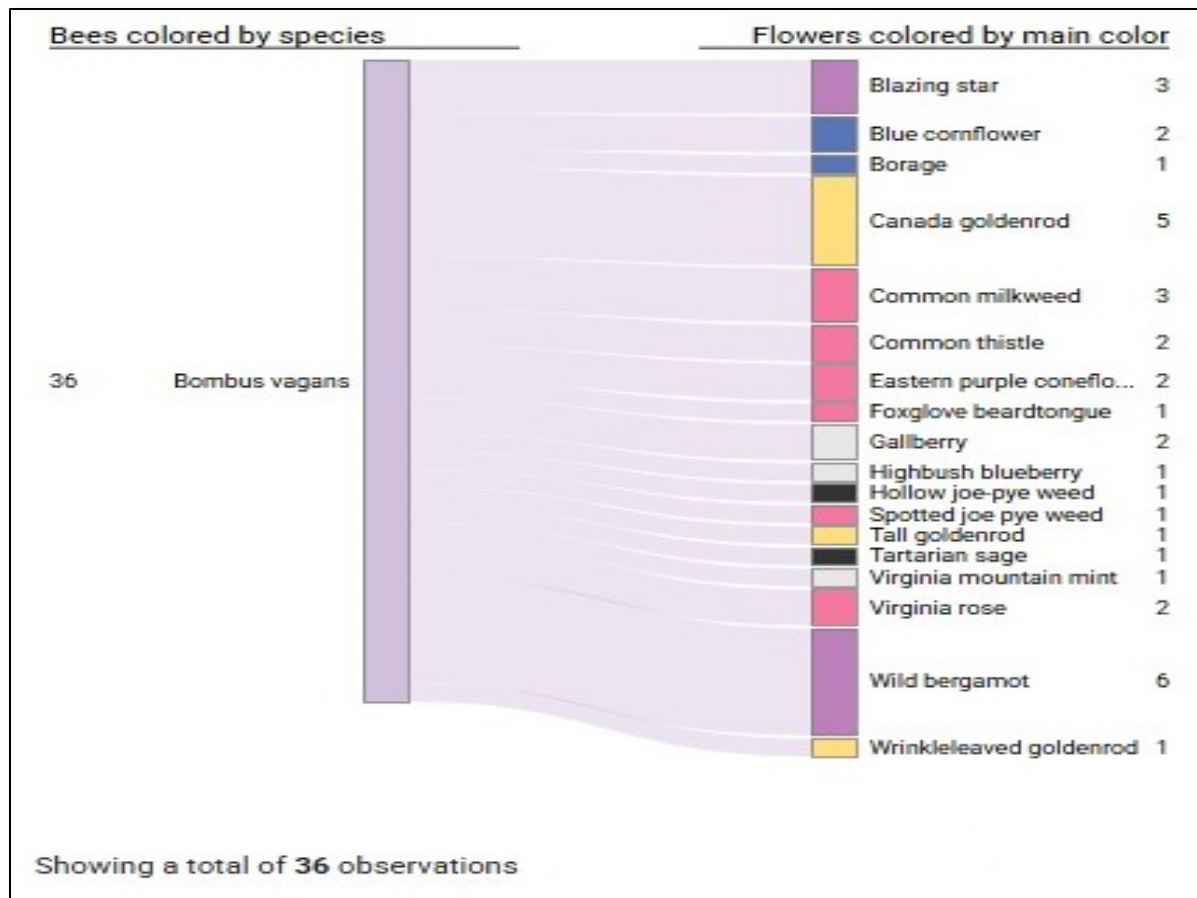


Figure 3. Total *Bombus vagans* nectar and pollen foraging observations 2023-2024 at New Hampshire Audubon McLane Center. Source: Beecology website, data analysis.

Overall, the most popular flowers observed were **Wild Bergamot** (*Monarda fistulosa*), followed closely by **Canada Goldenrod** (*Solidago canadensis*).

Figure 4 shows another data analysis focusing on ***Bombus bimaculatus*** and the plant species it visited. Several noteworthy plants added to the gardens supported this species, including:

- **Virginia rose** (*Rosa virginiana*)
- **Shooting star** (*Dodecatheon meadia*)
- **Northern bush honeysuckle** (*Diervilla lonicera*)
- **Garden cosmos** (an annual)

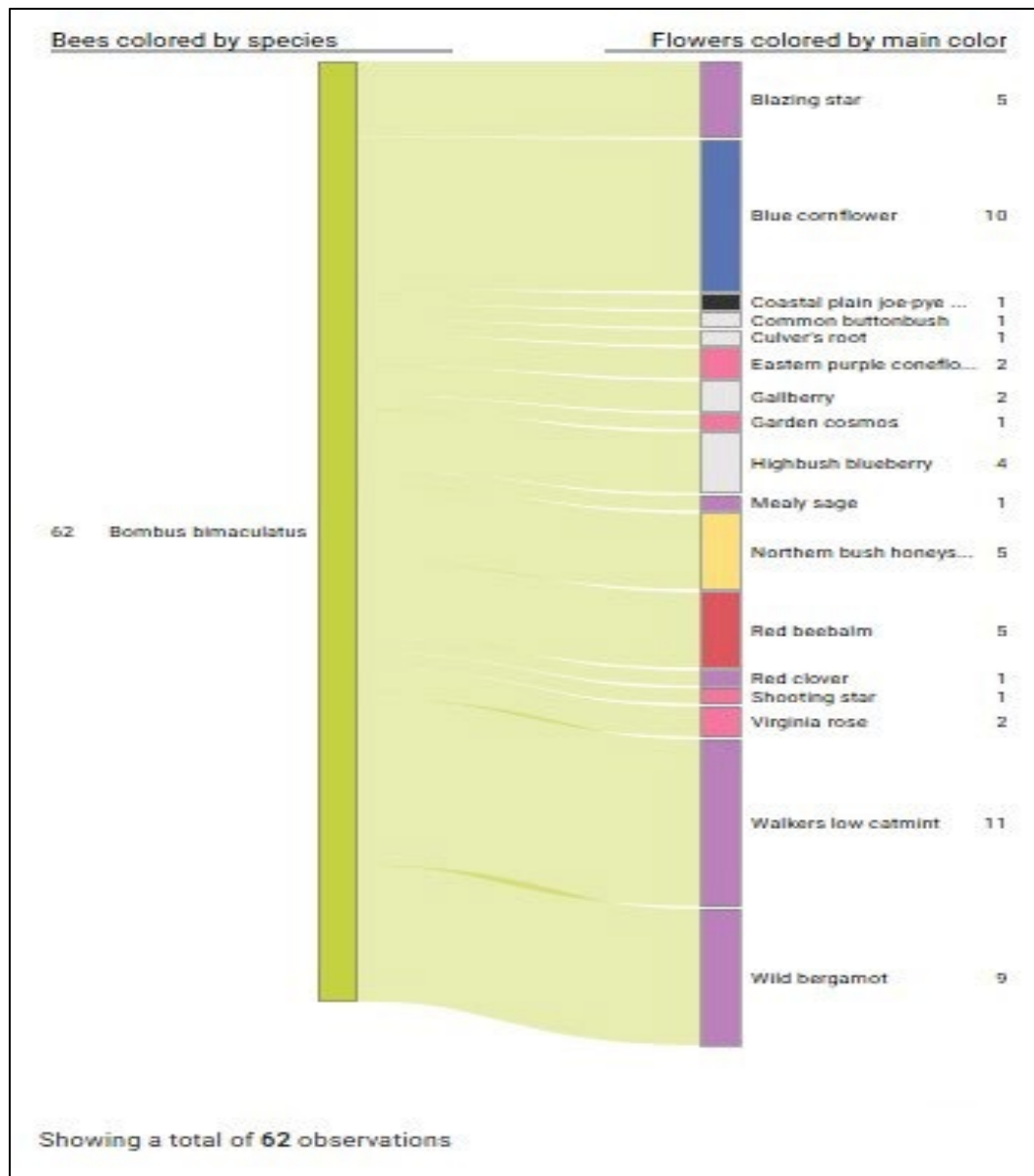


Figure 4. *Bombus bimaculatus* foraging observations 2023-2024 at New Hampshire Audubon McLane Center. Source: Beecology website, data analysis tools.

New Garden Area Yields Exciting Discoveries

In 2023, a **new garden area** was established on the hillside next to the **parking lot pathway**, featuring a variety of **native plants** selected to provide **continuous blooms** throughout the growing season. This new habitat attracted **numerous bumblebee species**, resulting in a wealth of video observations.

A particularly **exciting discovery** in this area was the observation of a **cuckoo bumblebee** (Figure 5) nectaring on **Northern bush honeysuckle**. This species was observed on this plant **five separate days**, adding a unique contribution to the dataset.



Figure 5. Cuckoo bumblebee at New Hampshire Audubon McLane Center June 24, 2024. Photo by Ellie Peabody.

A Rare Sighting: Tri-Colored Bumblebee

Another highlight of the 2024 season was the **Tri-Colored Bumblebee** (*Bombus ternarius*), shown in **Figure 6**. This **short-tongued species** was recorded foraging for nectar on **goldenrod** in the meadow. Only **two individuals** were observed during the season, with **one** captured as a formal observation.

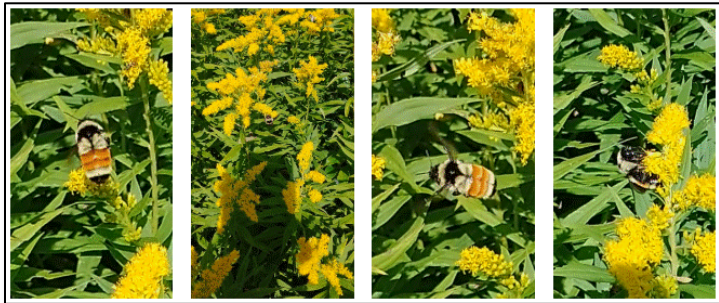


Figure 6. Photos from an observation log of a *Bombus ternarius* collecting nectar on Canada Goldenrod showing head, thorax, abdomen and the goldenrod plant at New Hampshire Audubon McLane Center, August 30, 2024. Photo source: Beecology website.

Looking Ahead

Data collection for the Beecology Project is **ongoing**, with continued opportunities to observe and analyze native bumblebee behavior. The results from this participatory science initiative are publicly accessible and can be viewed anytime on the [Beecology website](https://beecology.wpi.edu/website/home).

By participating in projects like Beecology and planting **pollinator-friendly gardens**, we can all contribute to the conservation of these crucial pollinators and the ecosystems they support.

RESOURCES

- Beecology Project website: <https://beecology.wpi.edu/website/home>.
- YouTube: "Exploring Connections: Beecology: a Community Scientist Helping Pollinators by Dr. Robert Gegear" <https://www.youtube.com/watch?v=miZEjPqZS98>.
- Beecology Project printable suggested plant list: <https://gegearlab.weebly.com/plant-list.html>.
- NH Audubon's annual native plant sale
- NH Audubon's annual Containers for Pollinators project at McLane Center

How To Help Bumblebees

- Provide bumblebees with nectar and pollen resources from spring to late fall by planting native plants with a variety of flower shapes and bloom times to maximize bumblebee species diversity.
- Don't use pesticides.
- Leave the leaves in the spring until bumblebee queens have emerged from their overwintering sites.
- Become a Beecology citizen scientist by making bumblebee-plant interaction observations using a smartphone and uploading them to the Beecology web-based app. It's free to the public, open to all ages, and can be done right in your own yard.