

# *Developing a Pollen Nutritional Composition Database*

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## **INTRODUCTION**

The current primary basis for selection of plants for bees is *attractiveness* (bee visitation). However, attractiveness does not always equate to better nutrition. The pollen nutritional composition database generated from our findings will serve as a robust tool for beekeepers, conservation groups, researchers, policymakers and growers in selecting plants for habitat development in a *scientific way* rather than being based on just attractiveness of a plant species to bees. This database will be the first of its kind for bee

forage plants in North America and will benefit all bee pollinators (native and managed).

### How To Store and Ship Pollen Samples:

- Hold the tubes with pollen in a cooler **with ice if short term** field duration
- Hold the tubes with pollen in a **cooler with dry ice if spending longer hours** in the field
- We will **provide the tubes** for collections; **do not mix pollen samples collected from different plant species**
- Store samples in **chest freezer (-20 degrees C)** if possible or regular fridge freezer as a last option. When storing in a regular fridge freezer, the samples need to be shipped out to us as soon as possible
- **Do not let samples thaw** to prevent degeneration or molding
- If samples are stored in regular fridge freezer, then **try to ship them sooner**
- **Shipping overnight over dry ice** (available at most grocery stores)

### How To Collect Pollen Manually:

#### **A. Natural pollen shedding**

1. Often cutting stalks of mature buds and placing them in a jar/vase with water overnight will allow the flowers to bloom.
2. These flowers are then ready the next day for hand collecting pollen grains.
3. Some flowers, such as sunflowers and bachelor buttons, shed a lot of pollen naturally.
4. Placing a piece of white paper or tin foil underneath the jar/vase will also capture a lot of the pollen that the flowers may naturally shed.

## B. Vacuum Method

- We have designed an attachment for handheld shop vacuums for pollen collection
- Works well on flowers with exposed anthers

### How it Works

- A 1½ inch PVC sink tailpiece is taped to a vacuum input hose then the tailpiece is inserted into a 1½ inch PVC plastic straight coupling
- 3 different sized nylon screening meshes from [componentsupply.com](http://componentsupply.com) are either screwed or rubber banded into the coupling
  - 7 µm screwed into bottom
  - 38 µm screwed into middle
  - 85 µm rubber banded to the top

## Vacuum Collection from Flowers

1. Hold flowers by the stem in front of vacuum attachment.
2. Rub flower back and forth for 10 seconds.
3. Move onto another flower from the **same species.**
4. Repeat process until vacuum suction becomes inadequate or the vacuum battery dies.

## Collection from Vacuum

1. Bring the vacuum to an enclosed area.
2. Place down a sheet of aluminum foil on the table.
3. Remove 85 µm mesh from coupling.
4. Using a **clean** paint brush carefully brush off the 38 µm mesh onto the foil.
5. Carefully remove the 38 µm mesh.
6. Brush remaining pollen from 7um mesh onto foil.
7. Fold foil in half and funnel pollen into collection jar.
8. Label the pollen jar with the appropriate information.
9. Clean all components with ethanol for next collection.

### C. Sonification

1. Hold the flower and aim center into the collection tube.
2. Vibrate the base of the flower with either a tuning fork or an electric toothbrush.
3. Can work efficiently on tomatoes, eggplant, and blueberry varieties.



Gardener, Laidback. "Pollinate Your Tomatoes with a Toothbrush!" Laidback Gardener, 8 Aug. 2016, <https://laidbackgardener.blog/2016/08/08/pollinate-your-tomatoes-with-a-toothbrush/>.

### D. Tapping Flowers

1. Place a **clean** piece of paper underneath the flower to catch pollen.
2. Tap the flower at its base to dislodge pollen onto the paper.
3. Collect pollen from the paper and place into a vial/small jar.
4. This method could work with both flowers that have been picked as well as flowers that are still attached to the branch/stem.



de Beer, Christine. Tutorials - Tapping Away Tulip Pollen. 19 June 2012,  
<https://christinedebeer.ca/tutorials/tapping-away-tulip-pollen>.

### E. Bagging Flowers

1. Section off the target flower bud by tying a mesh pollen bag / brown paper bags around it.
2. Wait for the pollen to fall off the flower and into the bag.
3. Collect the bag with the pollen inside.
4. Scrape off pollen from the bag and collect it in a vial/small jar.
5. This works well for floral species which produce a lot of pollen.



Photo by Seed Savers Exchange  
 Buttala, Lee. "Bountiful Blossom Bagging." Mother Earth Gardener, 30 May 2019,  
<https://www.motherearthgardener.com/organic-gardening/bountiful-blossom-bagging-zm0z19uzbut/>.

## F. Paintbrush

1. Use a clean, dry, short-bristled paintbrush and a jar/vial.
2. Gently brush the pollen from the flower into the container.
3. Can be used on flowers with high quantities of pollen, as very small amounts of pollen can get lost in the paintbrush bristles.



Reisch, Bruce I., and Philip Stewart. "Breeding Grapes - Making Crosses." Hort.Cornell.Edu, 2001, <http://www.hort.cornell.edu/reisch/grapegenetics/breeding/crossing2.html>.

## G. Invert and Twist

1. It is best to hold and twist each flower over a sheet of clean white paper.
2. Twist the flower using your thumb and finger until no more pollen comes out.
3. Scrape up the collected pollen from the paper with a clean razor blade.
4. Drop pollen into the tube.
5. Can work with flowers such as blueberries.



## H. Other Methods

If you have personally collected pollen with a method that we have not listed, feel free to contact us and let us know. Our information is located on page 7.

### General Tips:

- If the anthers (parts with pollen) of a flower are difficult to access, you can cut the petals away for better access.
- Make sure to always collect pollen when it is dry.
- When you collect pollen, take several pictures of the plant you collect from. Also, include a reference sample of that flower species (collect a couple of flower samples and ship that to us along with the pollen samples) when you send us your collected pollen.
- Avoid cross contamination of razor blades, tubes etc. as we need pure plant pollens. Thus, **always use clean tools.**

### Collecting Pollen from Honey Bees:

If hand collection of pollen is not feasible, then you can collect pollen from honey bee foragers. Honey bees collect pollen in hind leg pollen baskets. Honey bees show floral constancy/fidelity (tendency to visit the same species of flowers in one foraging trip).



1. Capture honey bees from target plant species.
2. Watch the bees carefully and make sure the bee that you plan to capture is

visiting only one species of flower.

3. Sample at least 50 foragers with both pollen pellets.
4. Complete the label information on the jar.
5. Chill the captured bee in the freezer to anesthetize (for about 2 minutes) if you like the bee to be alive and released after collecting pollen. Otherwise you can freeze the bee for a longer period (more than 15 minutes). Please do not handle anesthetized bees if you are allergic to bee stings as there is a possibility of the bee becoming active during the pollen dislodging process.
6. Carefully dislodge pollen from the legs of the captured bees.
7. Collect pollen in sample tubes.
8. Label the supplied tubes/vials for collecting pollen loads with the required information (plant species, date collected, etc.)
9. Record notes about the pollen.
10. Collect different types of pollen in separate tubes/vials and store in the freezer until shipping.
11. Ship frozen samples using dry ice to the specified address.
12. If you are confused or have more questions about the method please watch this demonstration video. [BeeCollection\\_v2 \(3\).mp4](#)

### **Contact Us:**

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