Studying nesting behavior of **Bombus melanopygus** for blueberry pollination

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Purpose

This is a 3-phase study to gain better insights into the nesting behavior of **Bombus melanopygus** for the purpose of having a reliable pollinator for blueberry crops. This study also acts as a cornerstone for future projects that are being planned.

Introduction

Bombus melanopygus (See Page 4 for supplementary information) is typically an aerial cavity nesting bumble bee. The queen awakens from diapause as early as February and begins her nesting cycle. Farmers need early pollination, most crops bloom late winter or very early spring. Very few pollinators are available at that time. However, because of the nesting behavior of **B. melanopygus**, it is a prime candidate for blueberry pollination for farmers. I believe **B. melanopygus** can be encouraged on farmland to increase the yields of blueberry farmers.

Farmer Practices

A number of farmers are aware that honeybees do not pollinate blueberries very well. In order to get proper pollination, bumble bees need to be present or a select number of solitary species. However, the situation arises where the land in which farmers place their crops is not always suitable for bumble bee nesting. The hedge rows are typically not maintained, and blackberries abound, and noxious weeds take over, leaving very little after crop blooms for the bees to feed. If it is maintained, the grass is typically cut very low consistently leaving a desert for the bees. Encouraging better Hedge row practices is the first step in consistent pollination.

Prerequisites

Population Survey

A survey of the chosen farmland of **B. melanopygus** should be conducted before the establishment of the bird houses. This survey is to establish whether **B. melanopygus** is populace in the immediate area. The first survey should be carried out in the month of February. Each queen found should be marked on the thorax with white marking paint and a clear picture should be acquired of each specimen. If no queens are found, a survey in March should be conducted as well. As soon as queens are found, the installation of the bird houses should be

performed. A radius of 1 mile from the center the field or fields should suffice. If the population is nonexistent, a different plot should be used until queens are found. However, the originally intended plot should not be forsaken, but have **B**. melanopygus integrated via relocated nests, farm raised nests or by queen release into the environment and be surveyed the following season to see if this had any effect.

Floral Provisions Survey

Survey the chosen area as previously described for floral provisions before the blueberry blooms occur and after. Conduct the first survey in February and perform them every month until the cycle of *B*. *melanopygus* is concluded. Acquire pictures of the floral types in each survey. If very little floral resources are found for pre-andpost blueberry blooms, then more should be planted on the hedgerow.

Blueberry Patch Survey

Acquire pictures of the patch being used. Annotate any diseases found, how the rows are maintained and discuss average berry yields the farmer gets each season for the past 5 years.

Execution – Phase 1 (First Season)

With the above being said, understanding **B. melanopygus'** nesting habits is paramount to a consistent yield. It is known that **B. melanopygus** tends to nest in used bird houses, particularly small cavity nesting birds such as finches and chickadees. Small bird houses will be set up on a single plot of land with the details recorded of where and when. The bird houses will be filled with chopped hay and dried moss to encourage the bees to nest. No birds will have used these houses. The entrance hole will be modified to fit only the size of a queen **B. melanopygus**. Twice per month, the bird houses should be surveyed for any nesting queens.

Specifications

- Orientation of bird houses: Facing SW surrounding the field of blueberries. They will be placed on the hedgerow.
- Size of bird houses: Width = 4" Length = 4" Height = 12"
- Modified Entrance Holes: 1" Diameter
- Box mount height: 5'
- See attached pictures for more details: Pg. 5
- Amount of Bird Houses: This will depend on the farm being used.
- Time frame: The houses should be placed when queens are sighted in survey.
- Target Bird Species: Black Capped Chickadee

Link to Map of Study locations

https://www.google.com/maps/d/u/0/viewer?mid=1zuBLeCJkblidElbN2sCZK_klpfYlBb8&ll=48.079505768807536 %2C-121.9587706031172&z=19

Post Study Results

After the cycle of the bees have ended, the bird houses should be handled as follows.

- Check each bird house for overwintering queens in diapause. If queens are found, leave the bird house alone, but mark the queens with red marking paint on the thorax. Mark the box as well.
- The bird houses that were used for nesting should be cleaned out and sanitized. New bedding should be installed, and the bird house is to be placed back on the berry patch for the next season.
- Any unused bird houses can be left alone and used in phase 2 of the study.

The data received from this study must be compiled into an easy-to-understand format for everyone.

Phase 2 – (Second Season)

A quarter mile diameter from the berry patch is to be surveyed again the following season. The preseason survey should occur in February and March. The goal is to find foraging queens. The queens are to be marked with white paint, and pictures acquired. The date, time, and location must be recorded as well. The bird houses are to be surveyed the whole season as phase 1 instructions annotated. The only change is the bird houses will already be installed. Floral provisions should also be surveyed or planted as per phase 1 instructions.

Phase 3 – (Third Season)

This phase is to be as phase 2 but for the following season.



Legend	
Bird House ┢	
Blueberry Field 💹	
Hedgerow	

↑ North

