

Aerial Fungi Project - Assignable Assets (AA)

PI: Bala Chaudhary 224-725-0415

bala.chaudhary@depaul.edu

Research Assistant: Paul Metzler 312-479-4626

paul.metzler@depaul.edu

DePaul University, Chicago, IL.



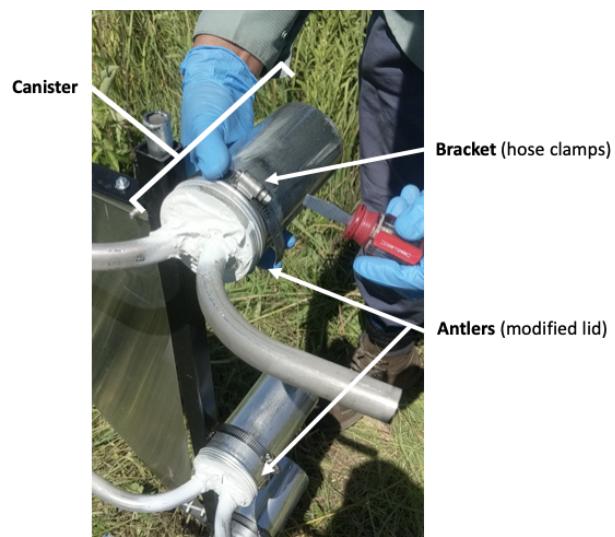
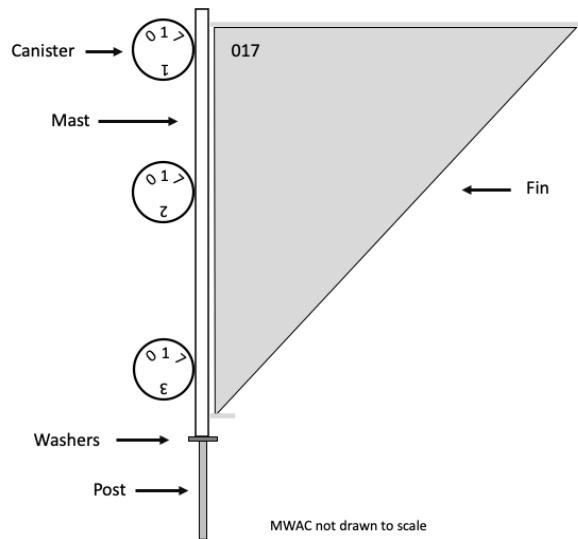
Standard Operating Procedure (SOP) for Sample Collection

1. Project Background:

The purpose of this project is to assess the mycorrhizal fungal community present in the air at all core terrestrial NEON sites and to determine the eco-climatic predictors of aerial dispersal. Five MWAC dust collectors are installed at a single plot at each of the 20 core sites.

2. MWAC Dust Collector Anatomy

The MWAC (Modified Wilson and Cooke) dust collector passively collects air particles using collection chambers that are mounted on a mast with a wind vane that orients the sampler inlet to face the wind. Each **mast** is mounted onto a steel **post** and held in place by **washers** that allow free rotation in the wind. Each **mast** holds 3 sampling **canisters** mounted with **brackets** (hose clamps) to assess the decline in particle transport with height. Each canister lid is fitted with two **tubes** (e.g. **antlers**); air flows into the longer tube and exits the shorter tube, depositing solid particles into the canister.



3. In order for the MWAC to function properly:

- The antlers must be positioned so that the tubes are horizontal to the ground.
- The antlers must be positioned so that the longer intake tube is upwind.
- The mast must rotate freely and not be obstructed by vegetation.

4. Materials Required for Sample Collection:

Basic supplies:

- GPS to locate MWACs (optional)
- Metric tape measure or meter stick
- Flathead screwdriver (the thicker the tip, the better)
- ~5 alcohol wipes
- Permanent marker
- Data sheet (emailed)
- Pruners/grass clippers for clearing vegetation

Supplies provided by AA team in Sample Collection Kit:

- Cardboard shipping box
- 15 aluminum canisters
- Nitrile gloves
- Aluminum lids
- A piece of paper indicating our contact information and return address

5. Sample Collection Steps

1. Less than 24 hours before sample collection, sterilize all 15 of the aluminum lids provided in the sample collection kit. Put on nitrile gloves and wipe each lid, inside and out, with a moist alcohol wipe, placing them in a clean ziploc bag.
2. Locate the first dust collector. Each MWAC dust collector is labeled with a unique number stamped on the metal fin and given three numbers (e.g. "017"). Each canister is labeled with the same number and either a 1, 2, or 3, noting its position at the top, middle, or bottom of the mast. Top=1, Middle = 2, Bottom = 3. See Figure 1.
3. Use the data sheet to record the condition of the dust collector and canisters. Note any damage to the mast, fin, brackets, canisters, or antlers. Note any vegetation or other obstructions that may have prevented full rotation. Note whether any antlers are not positioned horizontally to the ground.
4. Measure the distance from the ground to the top canister in centimeters. Measure from the ground to the center of the canister at a point between the two antler tubes. Note it on the data sheet.
5. Remove the first canister by loosening the bracket with a flathead screwdriver. Slide the canister out of the loosened bracket and hold it upright (antlers up). This will ensure that any collected dust settles to the bottom of the canisters.
6. Unscrew the antler lid (lid modified with tubes) and set aside. Quickly replace it with a plain sterilized lid. This canister will be mailed to DePaul University as a sample.

7. Still wearing gloves, sterilize the inside of the antler lid (lid modified with tubes) with an alcohol wipe. Be sure to sterilize all parts, including the aluminum tubes and epoxy and pay special attention to the difficult to reach inner seal and threads (Figure 2).
8. Identify the appropriate empty replacement canister by finding the canister with the correct label on the bottom. The number on the canister should match the number on the fin and have a 1, 2, or 3 to indicate the top/middle/bottom position on the mast (Figure 1). If, for some reason, the replacement canister does not have a label stamped into the bottom, please note this in the data sheet and add a label to the bottom of the canister using a permanent marker. If any of the labels appear wrong or inconsistent with our labeling scheme, please note this in the data sheet.
9. Sterilize the appropriate replacement canister by wiping the inside with an alcohol wipe. If you cannot reach the bottom of the canister with your gloved hand, you can use a pen or the back end of a clean screwdriver to properly apply the alcohol wipe.
10. When the canister and antler lid are both sterilized, screw the antler lid onto the canister. Make sure to screw it on very tightly!
11. Slide the replacement canister into the bracket and tighten using a flathead screwdriver. Be sure to position the antlers so that the longer tube is facing upwind or away from the fin. If you cannot tell which tube is the longer tube, you can take a quick peek inside the canister (Figure 2). You may need to make several adjustments to make sure that the tubes are parallel with the ground and that the can is tightly attached. Note that tightening the bracket can twist the canisters. **Do not** unscrew the lid in order to make the tubes parallel, please adjust the whole canister.
12. Repeat steps 4-10 for the middle and bottom canisters on the mast.
13. Clip any vegetation within a 1 meter radius of the MWAC that may impede free rotation.
14. Check one last time to make sure:
 - a. The numbers on each canister are correct: positioned 1,2,3 top to bottom and matching the number on the mast.
 - b. The brackets for each canister are tightened and intact.
 - c. The antlers are positioned so that the tubes are horizontal to the ground
 - d. The antlers are positioned so that the longer intake tube is pointed upwind, away from the fin.
 - e. The screw holding the washers in place at the bottom of the mast is tight.
 - f. The post is vertical and the MWAC spins freely.
15. Repeat steps 4-11 for each of the five MWAC dust collectors at your site.
16. Once collection has taken place, the shipping box should be full of 15 sealed canisters.
17. If the samples cannot be shipped the same day, they should be stored in a cool dry location and shipped the next day. Samples do not need to be frozen, but should not be left in the sun or in a hot car.
18. Ship the samples to the address provided in the sample collection kit. Ship the samples overnight using the following FexEx Account number: **790613694**.

Thank you for your assistance in making sample collections for this experiment! If you have any questions, please feel free to call or email.

Figures

Figure 1. Close up picture of canister labeling scheme. In this example, the canister from MWAC dust collector number 023, in the top position, is shown. Each canister is labeled with the MWAC number and either a 1, 2, or 3, noting its position at the top, middle, or bottom of the mast. Top=1, Middle = 2, Bottom = 3.

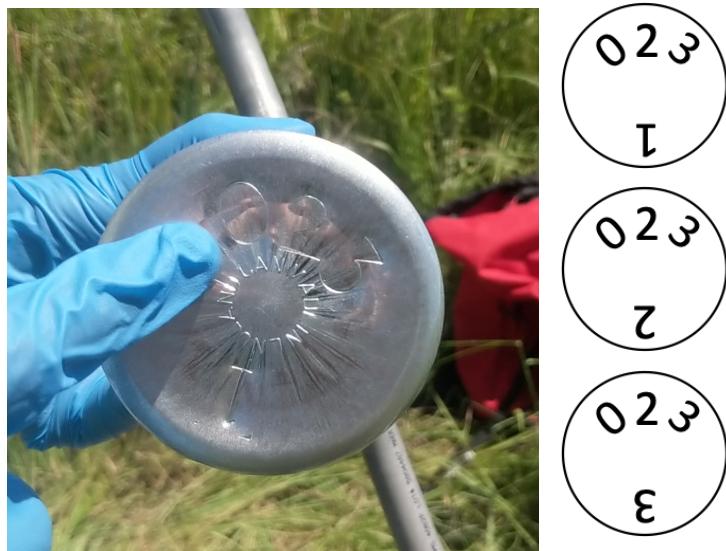


Figure 2. Close-up picture of antler lid from the inside. Note the longer tube on the left, which should be oriented to point upwind, away from the fin.

