

Aerial Fungi Project - Assignable Assets (AA)

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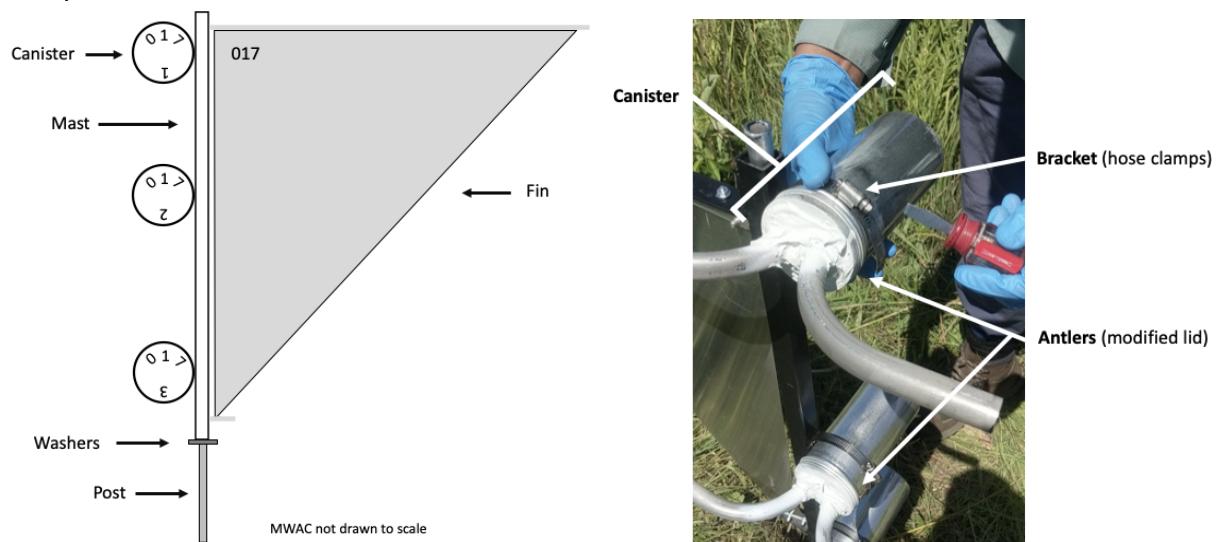
Standard operating procedure (SOP) for the installation of MWAC dust collectors from a kit.

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.

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.



Thank you for your help installing this experiment! We are highly motivated to make sure your installation goes well, so please call or email us with questions.

You will need:

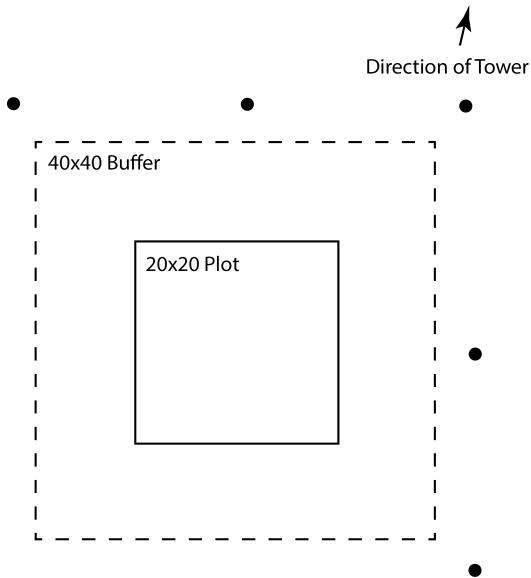
- Flathead screwdriver (the thicker the better)
- Heavy mallet for pounding in posts
- Installation kit (below)
- Tools to clear your local vegetation (just around the base of each collector)
- GPS
- *IF YOU ARE IN ROCKY SOIL* and are not able to pound a post into the ground, you will need to acquire a bucket filled with sand or gravel to install the post or some other means to secure the post.

Installation kit contents:

- Long Box
 - Five 5' steel conduit posts with the following items attached to each
 - Adjustable conduit coupling ring to hold washers
 - Two washers, taped in place on the washer holder. The washer with the smallest diameter is nearest to the washer holder
 - Pin at the top of conduit post
 - Five MWAC masts. The masts are steel and painted black. They have three hose clamps welded to one side and an aluminum fin bolted to the other. The fin is stamped with a three digit number.
- Regular box
 - Alcohol wipes
 - Plastic bag with:
 - Pipe brush
 - Nitrile Gloves
 - Post protector (a metal pipe end to protect the post while pounding)
 - These Instructions
 - Datasheets
 - Fifteen aluminum canisters (jars). These canisters will have a three digit number that corresponds to the mast stamped into the bottom of the jar. Across from that number will be a 1, 2, or 3 that indicates whether the jar should be attached to the top, middle, or bottom hose clamp (Figure 1).
 - Fifteen modified jar lids with two bent tubes sticking out (aka, "antlers").
 - Fifteen additional aluminium canisters *with lids attached*. **Keep these canisters for the fall collection.**

Steps:

1. Locate the plot. The plot has been predetermined and should meet three requirements:
1) The plot is upland, not a wetland, 2) soil DNA extraction happens at the plot, and 3) the plot is relatively near access points or other NEON projects so it is easy to keep an eye on to check for damaged collectors. If you don't have a record of which plot we have chosen, feel free to reach out. NOTE: Certain domains may use alternative plots to avoid cattle/bear disturbance.
2. At the plot, five MWAC dust samplers will be set up along two sides of the 40x40 m buffer. The two sides chosen should be between the tower and the plot. For example, in the diagram below, the tower is in the NNE direction, so the north and east sides were chosen for installation. The black dots indicate where each of the dust collectors should be set up. This image is not to scale, but the dust collectors should be set up about a meter outside of the 40X40 buffer. Small adjustments can be made in the setup location to avoid rocks or other obstacles.



3. Assembling the MWAC collector array
 - a. Conduit posts will be pounded ~30cm into the ground at the identified location. The bottom of the post will be closest to the conduit coupling ring. The top of the post will be closest to the washers and will usually have a pin at the end. Remove the pin and place the pipe protector over the top of the post, to prevent it from deforming while being pounded.
 - b. Once the post is installed and straight, you can remove the tape from the washers so that they can rotate freely. The slightly thicker washer should rest on the conduit coupling. The slightly thinner washer should rest on the slightly thicker washer.

- c. Clear any vegetation that may inhibit MWAC mast rotation
- d. MWAC masts should be placed over the conduit post so they rest on the washers and spin freely.
- e. Sterilizing the inside of each jar and lid with an alcohol wipe and screw the lid on tight (Figure 2).
- f. The canisters can now be attached to the hose clamps. Insert the jar into the hose clamp so that the clamp is about one inch below the lid and the longer tube is facing away from the fin. If it is unclear which tube is longer, you can unscrew the lid and peek inside, the longer lid should also be longer on the inside of the jar (Figure 2). The top canister will be labeled with a 1, the middle will have a 2, the bottom will have a 3 (Figure 1).
- g. Tighten the hose clamps with the screwdriver. Make sure the tubes are parallel to the ground, you may have to loosen and retighten the hose clamp. Do not try to straighten out the tubes by unscrewing the lid.
- h. The height of the canisters and mast can be adjusted using the conduit coupling ring and a screwdriver. Make sure the canisters are about 92 cm, 57 cm, and 32 cm above the ground. The heights can vary by a few cm, just make sure to record the exact height in the datasheet.
- i. Complete the following checks:
 - i. The numbers on each canister are correct: The 1, 2, and 3 correspond to top, middle, and bottom. The three digit number matches the number on the mast fin (Figure 1).
 - ii. The hose clamps for each canister are tightened and intact.
 - iii. The antlers are positioned so that the tubes are horizontal to the ground
 - iv. The antlers are positioned so that the longer intake tube is pointed upwind, away from the fin.
 - v. The screw holding the washers in place at the bottom of the mast is tight.
 - vi. The post is vertical and the MWAC spins freely.
- j. Please fill out the enclosed datasheet for this MWAC and repeat these steps until all five MWACs are installed.

NEXT STEPS

1. Please email a picture of your datasheet to bala.chaudhary@depaul.edu. In the fall, you will receive instructions on collecting the dust sample.

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.

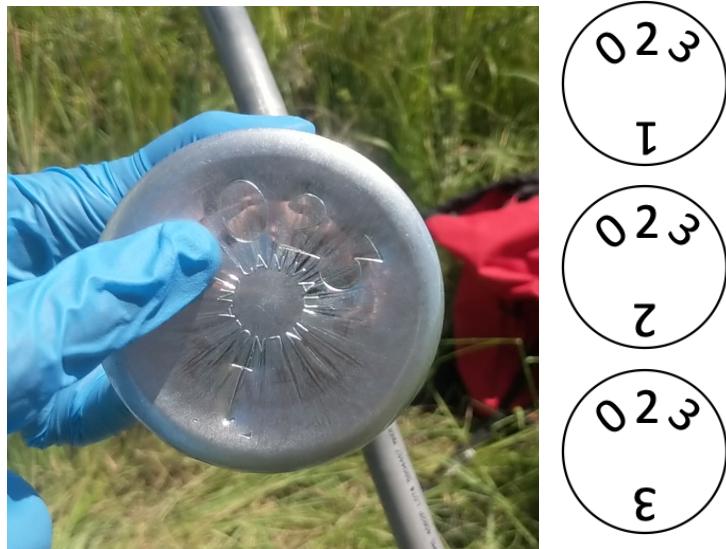


Figure 2. Close-up picture of antler lid from the inside. Note the longer tube on the left, which should be oriented to point upwind, away from the fin.

