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Version 1

Core Processing and Root Washing Protocol V.1

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Grady Welsh¹, Lara Roelofs¹, Shersingh Joseph Tumber-Dávila¹

¹Dartmouth College

Tumber-Dávila Lab

Tech. support email: grady.welsh@dartmouth.edu



Grady Welsh

Dartmouth College

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We use this protocol and it's working

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Abstract

Members of the Tumber-Dávila Lab developed this protocol for processing soil cores taken from the CLIFF site at Harvard Forest in Petersham, MA. The protocol provides guidelines for sorting soil cores and cleaning root material in preparation for root sorting. Refer to Tumber-Dávila Lab Protocols for related protocols on Soil Coring, Root Sorting, and Root Scanning.

Materials

2 mm sieve
63 µm sieve
Sieve catch pan
Tweezers
Brush
Weigh boats
Balance
Bath sonicator (ie Vevor Digital Ultrasonic Cleaner)
White plastic table mat

Before start

12-24 hours before root picking: remove soil from -22°C freezer to slowly thaw in refrigerator. Ensure sieves, catch pans, tweezers, and brushes are clean and dry.

Soil Sieving

- 1 Carefully pour the thawed core sample from the plastic bag onto a clean 2 mm sieve and catch pan.
- 2 Sift soil through the sieve.
- 3 Use tweezers to sort roots, rocks, and leaf litter from above the sieve into 3 weigh boats.

Note

Remove any foreign objects, such as metal shards from soil coring equipment.

- 4 Gently massage clumped soil through the sieve, allowing for the roots to separate and the soil aggregates to break down and pass through the sieve. Take care not to break fine roots in the process.

Note

Expect for this process to take **30-45 minutes**. For muddier samples or 0-5 cm increments, this process could take **>60 minutes**.

- 5 Once the remaining soil has moved through the sieve, scan the top and bottom of the 2 mm sieve for roots, rocks, and leaf litter caught on the mesh. Add these to their respective weigh boats.
- 6 Once no roots remain in the sieve, use a clean brush to brush caught soil from the top and bottom of the sieve into the catch tray with the rest of the soil.

Root Picking

- 7 Carefully pour the soil from the catch pan onto a clean white plastic sheet and evenly distribute the soil across the sheet.
- 8 Set a timer for **10 minutes**. Sort through the soil using tweezers to pick out all visible root fragments that fell through the 2 mm sieve.



- 8.1 After **10 minutes**, take a **2 minute** break.
- 8.2 Repeat another **10 minutes** of root picking.

Soil Storage

- 9 Split the soil for other analysis, such as isotopic, microbial, or other biogeochemical analyses (Part 1) and drying (Part 2). Record the wet weight (g) of both samples and refreeze (-22°C).

Note

To minimize disruption to soil biogeochemistry, both soil samples should be refrozen ASAP after sieving.

- 9.1 Part 1: Remove 20-30 g for biogeochemical analyses.  20-30 g
Label: Soil Split, Core ID, Increment, Wet Weight (g), Date
- 9.2 Part 2: All remaining soil.
Label: Soil, Core ID, Increment, Wet Weight (g), Date.
- 10 Leaf litter and rocks can be refrozen or immediately dried.

Root Washing

- 11 Place the sorted roots over a clean 63 µm sieve.
- 12 Gently rinse the roots using deionized water over the sink catch tray using low pressure and massaging the roots gently if necessary. Multiple rounds of rinsing may be necessary.

**Note**

Work gently to avoid breaking fragile roots and root tips. This should take **1–2 minutes** for small samples and **<5 minutes** for a 0-5 cm increment.

- 13 Remove washed roots from sieve and place in weigh boat. For deeper cleaning of fine roots, continue to Step 14. Otherwise, continue to Step 18.

Root Sonication (Optional)

- 14 To aid in removing any soils adhering to the roots, roots can be washed in a sonicator bath during the root washing process. The sonicator helps to shake off any soils stuck to the roots that remain after the initial washing process.

- 15 Use tweezers to move roots to a sonicator bath filled with deionized water.

Note

For best results, the sonicator should be filled fairly full.

- 16 Turn on the sonic power button (NOT the temperature one), and let it run for **5 minutes**.

Note

For those exposed to sonicator frequently in close proximity, hearing protection should be worn.

- 17 Remove clean roots from sonicator bath and place in weigh boat.

Note

After gathering large root clumps, it may be helpful to pour sonicator water into a clean 63 μm sieve to gather any remaining washed roots.

Root Storage



- 18 Roots can be immediately sorted (See Tumber-Dávila Workspace: Root Sorting Protocol), stored up to a week in a fridge (4°C), or long-term in the freezer (-22°C).