

Macrobotanical Sample Sorting Protocol

This protocol is designed to guide a researcher through the basic steps of recording and sorting a macrobotanical assemblage. This protocol has been designed for the EA Lab's assemblages, with their associated excavation terminologies, and data sheets. The time to process samples, or an entire assemblage, is dependent on the number of samples to be sorted, their contents, and the components to be identified (and or all combination of seeds, plant parts, and/or wood charcoal).

SAMPLE PREPARATION ~ 5 mins

1. Familiarize yourself with the data sheets, paying close attention to the types of data to be recorded (for example, economic plants require both weight and count to be recorded).

CONTEXT & DATA RECORDING ~ 10 mins

1. Using a pencil, record the sample's context information on an assigned data sheet. If there is a tag with the sample, paper clip it to the data sheet to ensure context information is not lost. Keep the tag and data sheet on the tray on which you will store your sample.
2. Tare the balance with the container used to measure the volume and weight of the sample (we normally use a glass 250 ml beaker).
3. After taring, place the container on the middle of an open manila file folder, to ensure none of the sample is spilled onto a surface that can't be funnelled into the container later. Carefully pour the sample into the container. Place container, full of the sample, onto the balance and record its weight and volume.

SIZE FRACTIONATION ~ 5 mins

1. Pour the sample into nested geologic sieves of 2mm, 1mm, and 0.5mm, with a pan at the bottom (with the largest size and top and decreasing in size to the bottom).
2. Place a cover on the top of the stack.
3. Carefully shake back and forth to disperse sample.
4. Place an open manila folder on a flat, sturdy surface. Place an empty sorting container or tray (we use white cardboard trays approx. 16 x 12 x 1.5 cm) on the middle of that folder. Beginning with the 2 mm sieve, carefully pour its contents into the tray. Once all the loose material has left the sieve, remove the tray to the side and quickly flip the sieve upside down over the manila folder and bang it once, firmly, against the surface on the folder. Then, leaving the sieve upside down on that surface, ensure all material is removed from the sieve by carefully brushing with a large brush. Then remove the clean sieve and pour the resulting fragments into the

tray with the rest of that fraction. Brush the folder clean.

5. Repeat step 4 for each smaller size fraction, placing each in a separate tray.

SORTING MACROBOTANICAL MATERIAL ~ time is variable

1. Set yourself up at a microscope, keeping in mind proper microscope ergonomics and posture. Adjust eye pieces so you can see through them clearly.

2. Start sorting with the 2mm fraction. While viewing your work area through the microscope, using a tool (paintbrush/skewer/featherweight tweezers), push each piece of material into a separate pile according to the table below. Alternatively, these categories can be placed in separate containers.

3. When the sample is completely sorted into the categories below, weigh each in aggregate and record on the data sheet. Once those aggregate weights have been recorded, begin to identify each in turn.

4. Be sure to record correct metrics (count, weight, etc.) for each taxon.*

Follow the table below to guide you through the types of material to be separated out and identified during sorting:

| Taxon | | 2mm | 1mm | 0.5mm | Pan |
|------------------------------|-------|-----|-----|-------|-----|
| Wood | | X | | | |
| Nutshell | | X | X | | |
| Seeds | Whole | X | X | X | X |
| | Frag | X | X | | |
| Shell | Whole | X | | | |
| | Frag | X | | | |
| Bone | Whole | X | X | X | X |
| | Frag | X | | | |
| Modern plant parts and seeds | | X | | | |

5. Fill out labels and put into vials/containers with appropriate taxa.

6. Proceed to the next size fraction and repeat from Step 2; however, aggregate

weighing of each category only takes place for the 2 mm size fraction. Once sample identification and counting/weighing are finalized, taxa can be placed in the same container from earlier size fractions (i.e., all *Triticum aestivum/durum* [bread/hard wheat] from the >2mm, >1mm, etc. will be stored in the same vial/canister).

7. Insert all vials of separated material, tags, and original bags in a new bag, with tag clearly visible.

8. Place sorted sample in appropriate location, and place completed data sheet into the project's assigned file folder.

*Some notes on recording counts and weights:

-Only record counts of whole remains. A seed is considered whole if more than 50% of its body is present, except for cereal grains, which are considered whole if the embryo is present. Pulses are measured in units of 0.5, as half seeds are common.

-If a seed or fragments of seeds are not heavy enough to register a weight greater than 0.000g, write 0 on the datasheet; do not round up to 0.001. "Zero" is still a value that will be recognized in digital form.

- Follow the table below to guide you through the data to be recorded for each taxon and size class.

| Taxon | Count | | | Weight | | |
|---|-------|-----|-------|--------|-----|-------|
| | 2mm | 1mm | 0.5mm | 2mm | 1mm | 0.5mm |
| Partial cereal grains – embryo present | X | X | X | X | X | |
| Partial cereal grains – embryo absent | | | | X | X | |
| Whole economic seeds | X | X | X | X | X | X |
| Partial economic seeds | X | X | | X | X | |
| Whole wild seeds | X | X | X | | | |
| Partial wild seeds | X | X | | | | |
| Countable plant parts | X | X | X | | | |

| | | | | | | |
|---------------------|---|---|---|---|---|---|
| Whole nuts/fruits | X | X | X | X | X | X |
| Partial nuts/fruits | X | X | | X | X | |
| Wood | | | | X | | |

- Microscope work is fatiguing — be sure to take breaks! Follow the 20-20-20 rule to prevent eye fatigue (and damage): every 20 minutes, look at something 20 feet away for 20 seconds.

DATA STORAGE ~ variable

1. Information from the datasheets will then be entered in to the appropriate database on the lab computers for digital recording and storage, as well as future statistical analysis.

Revision History:

Created by Kathleen M. Forste and John (Mac) Marston, Boston University: 9/1/17

Standardized by K. Wade, Boston University: 3/8/18

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