Experimental Archaeology as a Resource for Approaching Formation Processes of Seed Assemblages: First Results.

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The questions

- How does charring affect seed and fruit assemblages (not single items)?
- How do these assemblages respond when burned or when exposed to open air for a short time?

Designing the experiment and the variables under study

Formation processes and the properties of artifacts have been defined by Schiffer (1983, 1991). How each formation process affects each property is still to be outlined for most of the archaeobotanical record. A systematic project of experimentation must be carried out to establish patterns that can be applied to the interpretation of the archaeobotanical record. This requires the definition of the variables under study and a seed-by-seed description. The concepts used, the method of description and the database follows previous works (Antolín and Budi 2010).

Variables:
- Under study type: depositions (open-air/buried), technique of excavation (trowel/screed/water), soil processing method (trowel/water-sieving), combustion effects on grains (popped seeds, grains with pronunciations, deformation), state of preservation of the grains, embryo adherence, degree of fragmentation of the record.

The experiment: A previously described assemblage of cereals and legumes will be charred under controlled conditions. Thus, the composition of the assemblage will be known, as well as the heat exposure conditions.

Different units of analysis are needed to have all the possible combinations among type of context, techniques of excavation and soil processing method. Thus, 5 pits will be dug (see points 4 and 5). This allows us to control the horizontal and vertical distribution of the artifacts by isolating them in different units, but of the same kind.

1. Initial description of the assemblage

6086 remains were chosen, c.190 ml of remains from the last stage of processing of cultivated plants (broad-leafed legumes).

They were collected during the “Fiesta del pescador del inmundo” (Hunting and Fishing Fair) from La Fustilla (Lleida). The whole washing, winnowing and sieving process they had undergone was registered unpublished.

100% of the remains were intact and grains still had the embryo. 4 grains were fragmented, 9 grains had been cracked during threshing and 2 had been peeled/cut.

1560 seeds of lentils were also added.

2. Charring

The remains were put in two boxes of aluminium between two layers of sand to create an anaerobic environment. One box contained 5,111 remains which were destined to be buried in 4 pits, while the other contained 3,597 remains that were to be exposed to open-air conditions. They were charred in a smuffle (Select-Horn J.P. Selects) from the Anorganic Chemistry and Chemical Analysis Laboratory of the University of Lleida. The remains were heated for 40 minutes at 200°C (after 1 hour and 20 minutes of slowly increasing the temperature).

3. Description of the assemblage after charring

Charring has had differential effects on both assemblages. The remains from the smaller assemblage were more charred but the ones from the bigger assemblage presented different degrees of carbonization. At least 12% of the remains weren’t completely carbonized. Lentil seeds have swelled during charring 100% have broken the tests as a result of this swelling in the smaller assemblage but less than 70% in the bigger assemblage. All the barley grains from the smaller assemblage showed severe distortions (see picture below). Only some grains of barley from the bigger assemblage were not completely charred or not popped. Aggregates of grains are present in both assemblages.

14.6% of the cereal grains of the bigger assemblage are popped or show pronunciations, while 17.7% show these features in the smaller assemblage. Grains that had suffered fragmentation or cracking during threshing were clearly detected. Characteristic bulging sections have appeared on the pre-charring fragments of cardiosperm. Cracked grains have also adopted a similar type of distortion (see picture below). Pre-charring fragmentation on lentils is more detectable.

4. Pit digging and deposition of the grains

5 pits have been dug. A 1 to 1.5 m. 1 will contain 1/3 of the bigger assemblage and they will be covered with soil. The fifth pit (2) will contain the smaller assemblage, which will be left exposed to open-air conditions. The assemblages were left for 30 days.

5. Excavation

7. Final description

Formation processes have had very little effect during the period of exposure, recovery and processing of the remains. Covering the grains with soil adequately protected them and this soil was still very loose when excavation took place, which resulted in a very low fragmentation rate. Fragments only appeared in the samples treated by water-sieving (15% total).

Pit 2 had some new soil naturally deposited, which resulted in the formation of concretions that affected some of the remains. Also some grains were involuntarily displaced by snails (see picture next to the text). AHA!

6. Soil processing

The soil samples were measured and soaked with water before processing. Flotation was undertaken with a 1 mm mesh sieve inside and outside the machine. Water-sieving was also done with a 1 mm mesh sieve inside.

References


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Maybe they didn't help that much in the end...