Roman Hovsepyan

Institute of Archaeology and Ethnography, NAS RA

Archaeobotanical sampling: Instructions for fieldwork

Archaeobotanical investigations give data on plant economy and environment of the past. Those data are obtained predominately via study of plant macro-remains separated from cultural deposits of archaeological sites. The current article provides a short outline of archaeobotanical investigations and instructions for archaeobotanical sampling of cultural sediments during archaeological excavations. These instructions are for the excavating archaeologists and students, who are not always familiar with the methods of archaeobotanical sampling, but are required to do that work.

Key-words: archaeology, plants remains, methodology, sediments, excavations.

Ռոման Հովսեփյան

Հնագիտության և ազգագրության ինստիտուտ, ՀՀ ԳԱԱ

Հնաբուսաբանական նմուշառում. դաշտային աշխատանքների ուղեցույց

Հնաբուսաբանական հետազոտությունների միջոցով հնարավոր է ստանալ տվյալներ անցյալի բուսական տնտեսության և միջավայրի մասին։ Այդ տվյալները ստացվում են գերազանցապես հնավայրերի մշակութային շերտերից առանձնացրած բուսական մնացորդների հետազոտության արդյունքում։ Հետագա հնաբուսաբանական հետազոտությունների համար մշակութային նստվածքների նմուշառումը հաճախ անում են պեղող հնագետները և ուսանողները, ովքեր ոչ միշտ են ծանոթ այդ նմուշառման մեթոդաբանությանը։ Սույն աշխատանքը հնագիտական պեղումների ընթացքում հնաբուսաբանական հետազոտությունների համար մշակութային նստվածքների նմուշառման ամփոփ ուղեցույց է, որը գրվել է որպես պատասխան առկա պահանջարկին։

Բանալի բառեր. հնագիտություն, բուսական մնացորդներ, մեթոդաբանություն, նստվածքներ, պեղումներ։

Роман Овсепян Сбор археоботанических проб: инструкция для полевой работы

Археоботанические исследования дают возможность получить данные об экономике и окружающей среде прошлого. Эти данные можно получить преимущественно с помощью исследования растительных остатков из культурных слоев археологических памятников. Необходимий для археоботанических ислледований отбор и взятие проб культурных отложений совершается археологами и студентами, которые не всегда знакомы с методикой археоботанического опробования. Данная работа является своеобразным справочником по методике отбора и взятия проб в археоботанических ислледованиях, которая составлена согласно нынешним требованиям. This article was written as a response to the demand of short and clear explanations of archaeobotanical studies and especially to the demand for instructions for the sampling during fieldworks and excavations. Other publications containing information about archaeobotanical (palaeoethnobotanical) sampling methodology (cf Jones 1991, Zohary et al 2012, etc), as a rule, are concentrated on the theoretical part of this issue and lack of information about simple tricks that are very useful during fieldworks and excavations and raise the productivity of archaeobotanical investigations. In addition, the instructions below have been adapted for the regions with dry continental climate.¹

Agriculture and other forms of plant economy were the main sources of food and other raw material for most of the human population in the past. Archaeology, botany, agronomy, genetics, chemistry, anthropology and linguistics, among other disciplines, can contribute to different degrees in the studies of prehistoric plant economy, but the most reliable and productive source of evidence comes from the examination of plant macroscopic remains² retrieved from archaeological excavations (cf. Zohary et al 2012). Information obtained via archaeopalynological analysis, phytolith analysis, archaeozoological, micro-stratigraphical, chemical and other investigations combined in archaeology can complement our knowledge about the plant economy of ancient societies, but they can't replace the information provided by the study of macro-remains of plants.

Here are the main steps for the archaeobotanical investigations (cf. Hovsepyan 2009).

- **Sampling**. The sampling of cultural sediments from archaeological sites should be done during excavations by following certain simple rules (see below) in order to obtain reliable data.
- Recovery and separation of plant remains from archaeological deposits. Flotation, wet-sieving and dry-sieving are the most common and the most productive methods for separation of plant remains from archaeological deposits. The choice of the method or the combination of methods depends on the preservation type and the sizes of plants macro-remains and from the character of the sampled sediments. If available, fragments of building clay and ceramics with plant impressions and other remains should be picked manually. Sometimes the plant macro-remains are very large and/ or represented with concentrations; for this case as well the manual pick up shall be applied.

¹ Although for most of the information you may find as repetitions in other publications, it is written based on the author's own experience accumulated mostly during his fieldworks (over 60 sites; 2000-2017) at the territories of Armenia, Romania and Egypt.

^{2 &#}x27;Macroscopic remains' of plants are large, visible by eye remains of seeds, fruits, imprints of those, charcoal and other parts of plants.

- Preparation of recovered plant remains are carried out by cleaning identifiable and useful plant remains from dirt and unidentifiable organic macroremains.
- Sorting and grouping of the findings according to their organic ascription (seed, fruit, wood, etc), morphology, anatomy, biometric features, preservation type (charred, mineralized, uncharred, imprints, waterlogged, etc) and degree. The description of the key ID criteria is desirable.
- Identification of taxonomical ascription of the findings (groups of findings).
- **Counting** of the findings group by group, statistical analyzes.
- Documentation / photography of the most representative findings.
- Interpretations of the retrieved archaeobotanical data in relation to the archaeological contexts.
- Description of the plant economy and vegetation cover of the site and surroundings.

Botanical, ecological and ethnobotanical study of the region can be very useful for the investigation of the past plant economy and vegetation cover as additions to archaeobotanical studies. Interpretations of archaeobotanical data and descriptions of plant economy and vegetation are being done by making parallels with present day situations and available historical sources. That is why the study of present day agriculture, ethnobotany, flora and vegetation cover of the region can be very useful implementations for the archaeobotanical investigations, especially for late prehistoric and historic period sites.

The objective of this article is to provide instructions for archaeobotanical sampling during archaeological excavations. This information is expected to be used by the excavating archaeologists and students. The key points and rules for the archaeological sediment sampling for archaeobotanical investigations are the followings.

Choice of contexts. The contexts and layers, which should be sampled, must be clearly explainable, i.e. at least for the first stages, the investigator should know, even preliminarily, from what period and what kind of context the sample comes from. The contexts with notable human activity, especially the ones related to fire, are preferable because usually plant macro-remains are preserved in the charred state. Usually, the fireplaces where presumably some cooking activity took place, are the most suitable contexts for archaeobotanical sampling. Other good contexts are the storage pits, trash pits, vessels, floors or just ashy layers. For funeral contexts, the contents of the vessels and surrounding sediments of the body are preferable for sampling. It is not always possible to be certain about plant macro-remain presence or their absence without processing the sediment.

• Condition of sediments before sampling. Plant macro-remains, particularly the carbonized ones are very fragile especially when they are wet (waterlogged remains are an exception). That is why, the sampling shall be done when the sediments are not wet (waterlogged sediments are an exception). Air-dry condition of the sediments with some humidity is acceptable, while it is meaningless to sample wet, muddy sediments, because all fragile organic macro-remains are being smashed during sampling. So, for example, if it rained the previous night and the trench is wet, it is highly advisable do not work on the area to be sampled and wait until it will get dry.

Sediments should not be crushed to small particles during sampling, because the fragile macro-remains will be destroyed. Sediment excavated very shallowly (millimeters) will have only heavily fragmented and thus unidentifiable material in it. Deep excavated (several centimeters and more) sediments that are in large pieces are desirable. Any large stones should be separated from the sediments during sampling prior to storage.

Quantity and volumes of samples. In general, the more sediment samples you collect for processing, the better opportunities you will have for statistical information relating to the site. The optimal volume of the sampled sediments for each archaeological context is 20-30 liters (if such amount of the samples is available there). The samples that are less than 5 liters usually reveal very few plant macro-remains and are not reliable for statistics. But, in certain cases (smaller vessels, pits, fireplaces, etc) the volume of sample is much less and the concentration of plant macro-remains is very high. For such cases, we should try to take all contents of those contexts.

In general, the advised minimum volume of the sampled sediments should be 10 liters (if available) to ensure normal amount of findings from certain context and reliable statistical data.

In case the site will be investigated for archaeobotany for the first time, small (min. 5 liters) samples from various contexts are acceptable. But, in general, it is preferable to have, for example, a 30-liter sample from one rich, clearly explainable and dated archaeological context, rather than having many small samples from different contexts.

- Unmixed samples. Only intact or minimally disturbed layers and contexts should be sampled to have certain and reliable data. All disturbed contexts should be avoided. The same concerns also to the sterility of samples during the excavations and sampling; the samples should not be mixed with each other or with the recent sediments (e.g. soil). The mixed samples should be thrown away to avoid future mistakes and misinterpretations.
- Labeling. The samples should be labeled with details: the site, layer, context, sometimes also the depth, sample volume, sampling date, who sam-

pled, etc. The samples without labels or with incomplete labeling are lost for science.

• Storing. The samples should be stored in dry conditions to minimize destruction of the plant macro-remains (see the *Conditions of sediments before sampling*). The storing of the samples in wet conditions is unacceptable; it is meaningless, because all plant macro-remains will be smashed. The best option is to collect the samples in aerating bags and store under some cover or shelter in order to protect them from rain and the sun, ensuring a continual drying of the sediment. Putting samples additionally into boxes will raise the chances of macro-remains "survival", especially in case the samples should be transported.

These above-mentioned instructions hopefully will be useful for the specialists and students involved in the field archaeology, will help to raise productivity of archaeobotanical investigations and will contribute to development of archaeobotanical investigations in Armenia and in other countries.

Bibliography

Hovsepyan R.A. 2009.

Field crops and common weeds at the territory of Armenia in Neolithic – Iron Age periods. Thesis for getting Ph.D. degree in biology by specialization of "Agriculture" (06.01.02). The Scientific center of Agriculture and Plant protection MA RA. Yerevan, (in Armenian).

Jones M. K. 1991.

Sampling in palaeoethnobotany. Progress in Old World Palaeoethnobotany. Van Zeist, Wasylkowa & Behre (eds), Balkema, Rotterdam, Brookfield, 53-62.

Zohary D., Hopf M., Weiss E. 2012.

Domestication of Plants in the Old World. 4th edition, New York, Oxford University Press.