
How to Collect Archaeological Wood and Charcoal for Dendrochronological (Tree-Ring) Analysis

For archaeological samples and historic/old building samples

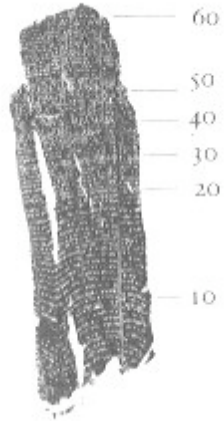
The Malcolm and Carolyn Wiener Laboratory for Aegean and Near Eastern Dendrochronology at Cornell University analyzes wood and charcoal from archaeological sites, historic buildings, and forests, etc., throughout the Aegean, the Balkans, the Eastern Mediterranean, and the Levant. We seek to construct site and then regional chronologies by species. The aim is to enable precise dating of wood samples and the structures from which they derive; the long tree-ring chronologies which result also enable dendroclimate and other environmental studies. We have samples representing most periods of history and the prehistoric era as far back as the Neolithic in Turkey. Our chronologies as of 2006 total around 8000 years. For a schematic diagram of our chronologies, separated by species, please refer to the [bargraph](#).

WHAT IS A GOOD SAMPLE?

Generally any sample of oak, pine, fir, spruce, juniper, or cedar with around 50-75 or more rings can be crossdated if a secure chronology exists for that period. Ideally, the best samples have 100 or more rings. It is not the *size* of the sample that is important, but rather the *ring-count*. For example, we have from Middle Bronze Age sites in Turkey (Kültepe and Acemhöyük) burned foundation logs 40cm in diameter with 250 to 430 rings; from the same sites we have additional samples that crossdate even though they are only 4cm in diameter and have only 150 rings. But we also have "large" samples from fast growing trees that, despite lots of material, have only 30 to 50 rings, and these usually are not capable of being dated by dendro alone. (However, where *important* archaeologically, dendro-radiocarbon wiggle-matching may be an option we can discuss.)

If you as the excavator or collector cannot make a judgment of the ring-count at the time of excavation, preserve the wood as explained below, and we will make the count either at your site or in the laboratory. Both unburned and carbonized wood can be measured. (The advantage of burned wood is that it does not rot.) Remember that for the best results a large sampling is better than only one or two pieces. And please send as many samples as you can if different timbers or samples are found. More is always best in dendrochronology: it allows replication and robust chronology construction. Of course, not every site has well-preserved wood, so when we are fortunate enough to find wood or charcoal, we try to take a sample of every log available.

Examples of two sections of charcoal: we like the one with 63 rings (although we would like it even more if it had 100+ rings).



Demircihöyük sample with 63 rings (a good chance for crossdating).



Demircihöyük sample with 12 rings (hopeless for crossdating).

HOW TO TAKE A SAMPLE:

For unburned logs in good condition, wrap string several times around the circumference of the log, beam, or plank *at the time of excavation*, and then cut off a section. The idea is to keep the sample intact and together (even if breaks occur). Reinforce the string by wrapping it again with architects' masking tape or with cloth (but please don't put tape directly onto the sample). Clearly label each sample with regard to position and provenience as you would any normal archaeological artifact. For a log in good condition the string should be sufficient; for a worm-eaten or otherwise eroded sample, extra string and tape or even cloth or paper towel should be used to keep the sample intact, especially after the section has been removed from the earth. Remember that every time a ring is lost a year is lost! And be very very careful of the outside. We want to bark or sapwood--if present--as this really defines the cutting date of the tree. So especial care is needed as this is also the most fragile element of the sample.

For carbonized or partially-carbonized samples, string is the best stabilizing material. Each piece of charcoal found should be wrapped in string to form a protective "shell" around the sample. Cloth or paper towels or toilet paper held in place with masking tape is also useful to wrap around your stringed "shell." Otherwise the sample may flake and thereby lose a number of rings. The sample should then be bagged and clearly labeled.

Many times, whole carbonized logs are preserved in the foundations of buildings. In this case, expose the butt end of the log, wrap its circumference with string, and pull, saw, or break off a section. One person should hold the newly removed section, and another should wrap the whole sample in string. Place it immediately in a plastic bag and seal it. Keep it out of the sun!

For waterlogged samples it is most important that the wood not be removed from the water and allowed to dry out. After cutting a section of such a log, place it immediately in a plastic bag (preferably airtight), place the bag in a second bag if possible, label it with an indelible marker, and if possible keep it in a cool, dark place. You should also wrap the sample with string or tape to help hold it together. Send it to us ASAP. Time is important here. Courier is the best option.

There are sometimes cases in which the excavator or building historian may not wish to remove a whole section from a log or beam. In these circumstances, we can sample your wood with an increment borer which removes a 9mm diameter core from the log (which we then plug), leaving a negligible mark on the wood. Make arrangements with us for this service.

Samples should be wrapped in some kind of protective wrapping such as plastic bubble wrap to avoid damage during shipping. The key thing is: pack so the samples cannot bounce around inside the box. A stable package means we get an intact, useful sample. It is sometimes possible for our team to pick up samples by prior arrangement during our summer field campaigns: contact us.

NOTE: *Remember to label all samples completely.* We need to be able to identify the findspot as closely as possible. If possible, include a building plan which shows the place from which the sample came. **References to relevant publications are also welcome.** In all cases, please record the presence of bark you notice on any of the samples. This may tell the exact year the wood was used.

WHAT NOT TO DO:

Please do not encase charcoal samples in plaster! This is as bad as leaving it unprotected in a scarp, since the plaster will absorb any moisture left in the charcoal, and the sample will disintegrate when we cut open the plaster. If you cannot get a sample out of a scarp any other way, at least try to bind it with string and paper or cloth first. We will salvage what we can.

Do not encase charcoal samples in tinfoil. The action of the tinfoil rubs off rings around the edges of the sample, and does little to support the piece. Instead, a layer of string and gauze or paper will hold the sample together much better. Then put the sample in plastic zip-lock bag (or two) and wrap in bubble wrap.

If you must leave a sample in a scarp, please try to protect it from weathering. Bind it with string, wrap a plastic bag around and over it, cover it again with earth to keep it from drying out, etc. Its survival and usefulness for chronological purposes is best if you can wrap it with string, remove it, package it, and send it to us ASAP. The longer it is left uncovered, the greater the chance it will turn to dust.

WHERE TO SEND SAMPLES:

Samples should be sent to:

Prof. Sturt Manning	Laboratory Telephone: 1-607/255-8650
Aegean Dendrochronology Project	Laboratory FAX: 1-607/255-8336
B-48 Goldwin Smith Hall	e-mail: sm456@cornell.edu
Cornell University	
Ithaca, New York 14853-3201	
USA	

[\[ADP-Home\]](#)

HTML last modified 20061214 mjb