

Charcoal Identification and Radiocarbon Dating

It has been widely recognized that radiocarbon ages produced from the wood of long-lived trees can be much older than the actual events archaeologists are trying to date (e.g., Allen and Huebert 2014; Allen and Wallace 2007; McFadgen 1982; Rieth and Athens 2013). The problem of inbuilt age can be addressed by selecting short-lived materials such as twigs, seeds, nutshells, or wood from shrubs or small, fast-growing trees.

Archaeobotanists at IARII can examine charcoal assemblages to select short-lived taxa or plant parts for dating, helping clients minimize the effects of inbuilt age on their radiocarbon determinations. Taxonomic identification also can provide assurance that exotic materials, such as driftwood from old-growth continental forests, are not dated. The identification of historically introduced taxa (e.g., ironwood, *kiawe*, mango, or Christmasberry) can also provide further assistance in estimating the age of a cultural context before any material is dated.

For more information on this topic, email us for copies of the following:

- Allen, Melinda S., and Jennifer M. Huebert. 2014. "Short-Lived Plant Materials, Long-Lived Trees, and Polynesian 14C Dating: Considerations for 14C Sample Selection and Documentation." *Radiocarbon* 56 (1).
- Allen, Melinda S., and Rod Wallace. 2007. "New Evidence from the East Polynesian Gateway: Substantive and Methodological Results from Aitutaki, Southern Cook Islands." *Radiocarbon* 49: 1163–79.
- McFadgen, B.G. 1982. "Dating New Zealand Archaeology by Radiocarbon." *New Zealand Journal of Science* 25: 379–92.
- Rieth, T., and J. S. Athens. 2013. "Suggested Best Practices for the Application of Radiocarbon Dating to Hawaiian Archaeology." *Hawaiian Archaeology* 13: 3–29.



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For more information, visit our website at:

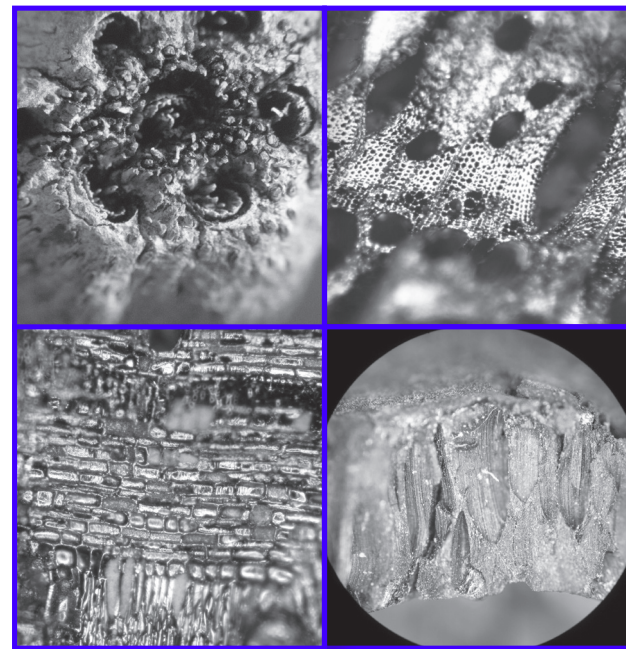
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dedicated to the study of
the human past*

WOOD IDENTIFICATION SERVICES

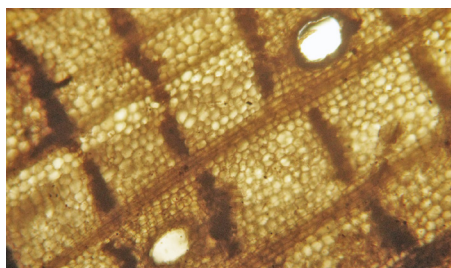
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Clockwise: *Pandanus* (*hala*) drupe, *Broussonetia papyrifera* (*wauke*) wood, *Cordia subcordata* (*kou*) wood, *Aleurites moluccana* (*kukui*) nutshell

PACIFIC ISLANDS & PACIFIC RIM

The structural integrity of wood and nutshells are often preserved in charcoal, making taxonomic identifications possible. Softer tissues, such as grass stems, leaves, and tubers, can also retain identifiable characteristics. Plant materials preserved in dry caves, and under waterlogged conditions that are deprived of air, can survive in recognizable forms for very long periods of time.



Erythrina sp. (wiliwili genus) waterlogged wood

FACILITIES

The Wood Identification Laboratory (WIDL) in our Honolulu office is outfitted with an epi-illuminated dissecting microscope, digital photography equipment, and a microtome. We use an extensive reference collection of thin sections and charred macro-remains of wood and other plant parts from the Hawaiian Islands, as well as other references from locations throughout the Pacific and South America.



2025 RATES

Identification of bulk samples:

\$450 per sample

This type of analysis is appropriate for paleoenvironmental studies, though could be informative for prehistoric agricultural studies.

Screening to select short-lived material for radiocarbon dating:

\$190 per sample

Taxon identification of a single fragment:

\$90 per sample

Contact us for submittal procedures. USDA import permits and shipping labels will be supplied for material originating outside the United States.



SERVICE DESCRIPTIONS

Identification of bulk samples:

- Sample scanned under low-power magnification
Sample size is normally limited to just 50 to 100 grams unless an additional hourly fee is applied. We suggest that the wood anatomist undertake any required subsampling as different kinds of samples may need to be subsampled differently. The wood anatomist will confer with the submitter about the appropriate analytical procedure.
- Taxonomic identification of all material in small samples; large samples split objectively and sub-samples processed to taxonomic redundancy
- Interpretive report
- Recommendations of short-lived material for radiocarbon dating

SERVICE DESCRIPTIONS

(CONTINUED)

Screening to select short-lived material for radiocarbon dating:

- Rapid screening of sample to locate short-lived materials (e.g., twigs, nutshells, short-lived species) for radiocarbon dating
- Taxonomic identification of select materials such as historically introduced taxa and naturally introduced exogenous taxa (e.g., conifer driftwood in Hawai'i)
- Basic report of findings includes brief description of plants identified

Taxon identification of a single fragment:

- Identification of one fragment of material or one item (e.g., a wooden artifact)
- Basic report includes brief description of plant material identified

STAFF

Analyses are performed by Carly Walker, B.A., and Darby Filimoehala, M.A., under the oversight of Gail M. Murakami, B.A. Ms. Murakami is an academically trained wood anatomist. She has over 40 years of identification experience and has analyzed charcoal assemblages from numerous locations throughout the Pacific, most commonly in Hawai'i, Sāmoa, Rapa Nui, and Marianas Islands.



Our staff is available to assist with the interpretation of results for reports, publications, presentations, and community outreach.