

Analysis of Plant Remains from SBA-46

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(Please note: tables can be viewed as worksheets in the single attached excel workbook)

Introduction

Archaeological plant and animal assemblages represent only a small fraction of what was originally used and deposited by humans in open-air settings. Natural and cultural factors can significantly modify organic remains, resulting in recovered assemblages that differ dramatically from the original deposits. As archaeologists, we examine collections that have undergone a series of processes—from the original selection of plants and animals by humans, to food preparation, cooking, discard, animal and insect scavenging, burial, decay, and weathering, to the recovery of food residues by archaeologists. Using standard methodological procedures for sampling, quantification, and analysis allows us to make sense of our assemblages in spite of the deleterious effects of these processes. Here we report on the identification and analysis of the archaeobotanical assemblage from SBA-46 (Helo'), a Historic-era Chumash settlement.

Recovery and Preservation Bias

The circumstances under which plants preserve best archaeologically involve extreme conditions (e.g., exceptionally wet, dry, or cold environments) that prohibit decomposition of organic matter (Miksicek 1987). Plants can also preserve through exposure to fire, which can transform plant material from organic matter into carbon (Miksicek 1987). The likelihood that a plant will become carbonized varies according to the type of plant, how it is prepared and used, and whether it has a dense or fragile structure (Scarry 1986). Plants that are eaten whole are less likely to produce discarded portions that may find their way into a fire. Plants that require the removal of inedible portions (e.g., hickory nutshell, corn cobs) are more likely to find their way into a fire, and thus into the archaeological record. Inedible plant parts represent intentional discard that is often burned as fuel. Moreover, because inedible portions tend to be dense and fibrous, they are more likely to survive the process of carbonization than the edible parts (e.g., hickory nutshell vs. nutmeats). Physical characteristics are also important for determining whether or not a plant will survive a fire. Thick, dense nutshells are more likely to survive a fire than smaller, more fragile grass seeds. Food preparation activities also affect potential plant carbonization. The simple process of cooking provides the opportunity for carbonization through cooking accidents. Foods that are conventionally eaten raw, however, are less likely to be deposited in fires than cooked foods. Some plants that find their way into the archaeological record in carbonized form were not eaten at all. Wood fuel is the most obvious example. Burned house structures can also yield carbonized plant deposits, and these deposits often differ dramatically from refuse deposits (Scarry 1986). Other non-food plants that become carbonized are incidental inclusions, such as seeds blown by wind dispersal (Miksicek 1987; Minnis 1981; Scarry 1986). Indeed, most secondary invaders are weedy species with lots of seeds (e.g., cheno/am plants) (Minnis 1981).

While we cannot ever hope to know the absolute quantities or importance of different plants in any past subsistence economy, the preservation and recovery biases discussed above do not prohibit quantitative analyses of archaeobotanical assemblages. The most commonly used plant resources in any subsistence economy are more likely to be subject to activities that result in carbonization (e.g., through fuel use and accidental burning) and ultimately, deposition (Scarry 1986; Yarnell 1982). Thus, we can

quantitatively examine the relative importance of commonly used plant resources through time and across space.

Laboratory Procedures

Twenty-seven samples from SBA-46 were collected with volumes ranging in size from 2.25-16.875 liters of soil. Due to time constraints and the high density of seeds per sample, only the light fractions of nine of the flotation samples were sorted in entirety, the results of which are reported below. According to standard practice, the light fractions were weighed and then sifted through 2.0 mm, 1.0mm, and 0.7 mm standard geological sieves. Carbonized plant remains were sorted in entirety down to the 1.0 mm sieve size with the aid of a stereoscopic microscope (10–40 X). Residue less than 1.0 mm in size was scanned for seeds, which were removed and counted.

Botanical materials were identified with reference to the paleoethnobotanical comparative collection at the University of California, Santa Barbara (UCSB) paleoethnobotany lab, various seed identification manuals (Martin and Barkley 1961; Delorit 1970), the USDA pictorial website (<http://www.ars-grin.gov/npgs/images/sbml/>), Calflora.org, Timbrook (2007) and Minnis (2004) which allowed us to identify the range of taxa native to the region. All plant specimens were identified to the lowest possible taxonomic level. Taxonomic identification was not always possible—some plant specimens lacked diagnostic features altogether or were too highly fragmented. As a result, these specimens were classified as “unidentified” or “unidentified seed.” In other cases, probable identifications were made—for example, if a specimen closely resembled acorn, but a clear taxonomic distinction was not possible (e.g., the specimen was highly fragmented), then the specimen was identified as a probable acorn and recorded as “acorn cf.”.

Once the plant specimens were sorted and identified, we recorded counts, weights (in grams), and provenience information. Wood was weighed but not counted, and no wood identification was conducted. Generally, most of the seeds identified in the samples were too small to weigh, and thus only counts were recorded. Other than counts and weights, no other measurements were taken on any specimens. We also sub-sampled selected samples that were extremely large. These samples were weighed and then systematically split using a riffle splitter; some samples were split in half and others in quarters depending on the overall weight of the sample. Counts and weights from the selected subsample were extrapolated using the total sample weight.

Basic Results

This section presents the results of the identification of the carbonized plant remains from SBA-46. Tables are attached as a separate excel file. Table 1 lists the common and taxonomic names of all identified species. Raw counts and weights are provided for each taxon; plant weight and wood weight are also provided. Combined, these samples yielded 52 plant taxa, in addition to several seeds identified only to Family. Table 2 lists the counts and weights for each sample. Table 3 shows seasonality of plants in order of ascending bloom time (See Appendix A in the attached excel file for un-summarized data from these samples).

The only definitive nutshell identified was acorn (*Quercus* sp.). Acorns were gathered from the trees and the ground, then dried and shelled. Because of the tannins

present in acorn nutmeat, leaching the tannins was necessary. This could be done by placing ground acorn meal in a bowl or leaching basin, which could then be filled with water to soak the meal and reduce the acidity of the acorns. After the leaching process, acorn meal could be incorporated into acorn mush and possibly breads. Possible bay laurel (*Umbellularia* sp.) was also identified. Bay leaves were used medicinally to help treat colds and headaches. It is unknown whether the Chumash also utilized the fruit of this plant (Timbrook 2007).

Several different species of fruit seed were identified, including barberry (*Berberis* sp.), blackberry/raspberry (*Rubus* sp.), elderberry (*Sambucus* sp.), huckleberry (*Vaccinium* sp.), manzanita (*Arctostaphylos* sp.), nightshade (*Solanum* sp.), plum/cherry (*Prunus* sp.), sumac (*Rhus* sp.), toyon (*Heteromeles* sp.), wild grape (*Vitis* sp.), and wild strawberry (*Fragaria* sp.), all of which have edible fruits. Wood from elderberry plants was used to make bows or firesticks, while flowers and leaves may have been used medicinally. Manzanita berries were eaten fresh or dried, or added to water as a drink. Stems from one species of sumac were used to make different types of baskets. Wood from the toyon plant was useful in crafting many different kinds of tools and hunting and cooking implements (Timbrook 2007).

Grains oil and greens seeds identified include amaranth (*Amaranthus* sp.), calandrinia (*Calandrinia* sp. and *Calandrinia ciliata*), chenopod (*Chenopodium* sp.), knotweed (*Polygonum* sp.), little barley (*Hordeum* sp.), miner's lettuce (*Claytonia* sp.), plantain (*Plantago* sp.), and tarweed (*Madia* sp. and possible *Hemizonia* sp.). Amaranth, calandrinia, chenopod, knotweed and tarweed seeds may have been eaten or ground into a meal; the leaves of both plantain and miner's lettuce also could have been consumed. Redmaids seeds were not only edible but also used as offerings in ritual (Timbrook 2007).

A possible seed from the legume family (*Fabaceae*) could represent clover, which has edible leaves and shoots (Timbrook 2007). Lupine (*Lupinus* sp.) and lotus (*Lotus* sp.) were most likely not consumed. Buckwheat (*Eriogonum* sp.) was most likely used medicinally. Chamise (*Adenostoma* sp.) wood was used for making tools such as arrow shafts and clam digging sticks; chamise leaves may have been boiled to make tea. One jimsonweed (*Datura* sp.) seed was recovered; despite being highly toxic, jimsonweed was an important medicinal, hallucinogenic and ritual plant. Roots and leaves were made into a drink called toloache. One pine seed (*Pinus* sp.) was also recovered; pine nuts are edible and pine wood and pitch were important building resources. Rose (*Rosa* sp.) fruits were edible, and petals could be infused into tea to help with stomach pain. Sage (*Salvia* sp.) seeds were also identified; leaves could have been used medicinally as tea. Verbena (*Verbena* sp.) roots were used to help combat fever (Timbrook 2007). Wild cucumber (*Marah macrocarpus*) rind and one possible seed were also present; the seeds from this plant have medicinal uses. The roasted seeds also could have been combined with other plants to create paint pigment (Timbrook 2007). A seed from the grass family that could be either wheat or barley (*Triticum/hordeum* sp.) requires independent assessment in order to secure its suspected identification.

Other seeds that probably represent incidental inclusions in the assemblage include bedstraw (*Galium* sp.), blue-eyed grass (*Sisyrinchium* sp.), bromus (*Bromus* sp.), bulrush (*Scirpus* sp.), canary grass (*Phalaris* sp.), catchfly (*Silene* sp.), centaury (*Centaureum* sp.), checkermallow (*Sidalcea* sp.), cryptantha (*Cryptantha* sp.), knotgrass (*Paspalum*

sp.), panicum (*Panicum* sp.), phacelia (*Phacelia* sp.), poppy (*Papaver* sp.), possible primrose (*Camissonia* sp.), saltbush (*Atriplex* sp.), Sanford's arrowhead (*Sagittaria sanfordii*), St. John's wort (*Hypericum* sp.), and possible violet (*Viola* sp.).

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