Chapter 1

Archaeobotany and Cultivation in Africa

Chapter Objectives

By the end of this chapter, you will be able to:

1. Relate the current theories surrounding the origins of cultivation in many regions of Africa.
2. Describe the limitations and advantages of contemporary archaeobotanical techniques in recovering and interpreting various aspects of the human past.
3. Interpret the evidence of the domestication of sorghum and bananas in Africa.
4. Explain the complexities of the relationship between humans and the environment in parts of Africa.

THE PROBLEM

Humans and Plant Interaction

Where does one start writing a history of humanity in Africa? The eminent historian John Iliffe proposed “human coexistence with the environment” as a key theme of his history textbook of the continent, suggesting that this should be a central issue in the study of Africa’s past. The relationship between human history and environment was also obvious to the first generation of formally trained historians from African states, such as the Tanzanian scholar Isaria Kimambo, who wrote as early as 1969 that “the evolution of political organization in this region . . . developed in response to the needs of these societies in their particular environments.” Kimambo pointed out that many of the sources that we have for the more distant African past involve features of the environment, especially plants and animals. Indeed, the oldest purposefully created “texts” we have about the African past—paintings made on rock—juxtapose the artists and their family

members with wild plants and animals (see Source 1.1). Such themes indicate the close relationship that our early ancestors, especially those who foraged (subsisted on naturally occurring foodstuffs collected by hunting or gathering), had with their environment.

**Source 1.1**

*Cave Painting of Hunters and Their Prey, Southern Africa (undated)*

“Hunters and animals in a cave painting in the Drakensberg range.”

The artists were probably related to contemporary San-speakers.

*Source:* Kenneth Garrett/National Geographic Stock.

Many African oral traditions (see Chapter 9) also discuss the relationships between their ancestors and the natural world, especially plants and animals. Such narratives cover not only foraging but also the subjects important to farmers and pastoralists, such as the discovery of staple crops and the taming of the chief herd animals of their communities. Consider, for example, the following oral narrative from among the Dogon people of the Sahel or savanna zone of Western Africa. It is drawn from a version related to French ethnologist Marcel Griaule by a Dogon community elder named Ogotemméli in the 1960s, although its origins are much earlier. One of its central themes is how the “first” Dogon man, Lébé, learned to grow millet, the staple crop (refer to Source 1.2).

**Source 1.2**

*Conversations with Ogotemméli, Dogon Speaker, Sahelian Western Africa, 1965*

‘The old man whom the seventh Nummo ate,’ said Ogotemméli, ‘was called Lébé. The stones which all priests wear round their necks are his bones.’ But men had no knowledge of the subterranean resurrections at the time when they occurred. They did not acquire the treasure of the stones immediately after they had been placed there. They did not know what caused the rains which now began to fall and were the signal for the clearing of the field marked out by the smith. These first rains indeed were for the purpose of purification. The seventh Nummo, a pure spirit, in swallowing the old man, had assimilated defiled human nature and the lapsed second Word. When he vomited to the rhythm of the blows on the anvil, there was ejected, with
Many of the earliest written documents in Africa also focus on the plants and animals that sustained life and society in pharaonic Egypt and other classical societies. For example, one Middle Kingdom (ca. 2040–1650 B.C.E.) Egyptian story is of a peasant traveling to market from the oasis of Wadi Natrun (Source 1.3). The story describes both imported and locally grown goods that he carried, some of which originated far away in Southwestern Asia and others that have not yet been identified.


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Source 1.3

"The Eloquent Peasant," Middle Kingdom Egypt/Kemet (ca. 2040–1650 B.C.E.)

(R1) There was a man named Khun-Anup, a peasant of Salt-Field. He had a wife whose name was [Ma]rye. This peasant said to his wife: “Look here, I am going down to Egypt to bring food from there for my children. Go, measure for me the barley which is in the barn, what is left of last year’s barley.” Then she measured for him twenty-six gallons of barley. (5) This peasant said to his wife: “Look, you have twenty gallons of barley as food for you and your children. Now make for me these six gallons of barley into bread and beer for every day in which [I shall travel].”

This peasant went down to Egypt. He had loaded his donkeys with rushes, rdmt-grass, (10) natron, salt, sticks of—, staves from Cattle-Country, leopard skins, (15) wolf skins, ns3-plants, ’nw-stones, tnem-plants, hprwr-plants, (20) s3hw, s3skw, misw-plants, snw-stones, ’b3w-stones, (25) ibs3-plants, inbi-plants, pigeons, n’rw-birds, wgs-birds, (30) wbn-plants, tbsw-plants, gngnt, earth-hair, and insr; (35) in sum, all the good products of Salt-Field. This peasant went south toward Hnes. He arrived in the district of Perfefi, north of Medenyt. There he met a man standing on the riverbank whose name was Nemynakht. He was the son of a man (40) named Isri and subordinate of the high steward Rensi, the son of Meru.

Sources such as these tell us much about how both past and contemporary societies understand their relationship to the plants and animals around them. We present some of this type of evidence extensively in future chapters. However, even when there are numerous examples of these documents, they do not make a comprehensive history of human–environmental interaction in Africa. Specifically, they cannot give us a complete picture of the process by which humans began to cultivate, or actively promote the growth of edible plants by transforming land or sowing seeds. Nor can they tell us much about how humans began to domesticate plants and animals by changing the characteristics of these species so that they could become more useful for food, medicine, labor, or ritual purposes. Both cultivation and domestication began so long ago in Africa that, in most cases, written documents are not available and even oral sources are highly suspect. Nor do we have the skill to find the answers to these questions in rock paintings made thousands of years ago.

Yet the topic of the origins and processes of domestication in Africa is a significant one for several reasons. As we discuss later, there are important connections between the cultures, economics, and politics of human societies on the one hand and food production and consumption on the other. Thus, it is difficult to develop a picture of how African societies developed over time without looking at topics such as domestication. Even when scholars have studied such processes, they have often misunderstood them. For example, one long-standing misconception is that Africans were inefficient and incompetent at domestication, a view that is based less on objective evidence than on a generalized negative view of Africa. 3 Another misconception is that domestication, once it happened, was rapidly adopted because both farming and herding were purely advantageous transformations. In fact, both came at a significant cost in terms of both health and leisure time.

Why should we bother to correct such mischaracterizations? Some researchers argue that it is worth exploring them for more than their significance for understanding the history of human interaction with the environment. Rather, as contemporary Africa experiences changes such as the effects of global warming and demographic expansion, and thus as food security becomes an increasingly important issue, exploring the historical processes by which humans have adapted to earlier transformations can help Africans to plan for the future.

The purpose of this chapter is to explore these topics by seeking to critically interpret sources and methodologies that are part of a relatively new field of science. Generally termed paleoethnobotany in the United States and archaeobotany in Europe and Africa, this field can be defined as “the analysis and interpretation of [plant] remains to provide information on the interactions of human populations and plants.” 4 Whichever term is used, it must be admitted that this type of research has its limitations. As a fusion of archaeology and botany, paleoethnobotany focuses specifically on plant remains, and thus cannot tell us about the domestication of animals. Nor can it tell us much about the ways Africans of the past viewed the environment, a task for which we rely more on linguistic, oral, and documentary evidence. Finally, plant remains are often small, difficult to work with, and require sophisticated and expensive methods for their analysis. Thus, there has been relatively little paleoethnobotanical work in Africa to date.

The work that has been done, however, has been very important in beginning to provide answers to questions about the relationship between humans and their environments in the African past. The first of these questions is how human communities learned to gather, produce, and consume a wide variety of food crops over time. In this question we examine both foragers gathering wild

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crops without significantly altering them as well as *domesticating* crops to make them more suitable for human use. We also investigate the pathways by which crops were shared among societies spread across large areas. It was once thought that this process occurred in a linear fashion with foragers or hunter-gatherers rapidly adopting superior cultivation strategies as they became available. More recently, archaeobotanists have identified a more complex model of exchange. They have noted that even societies that practiced cultivating and/or pastoral strategies also often gathered wild crops and hunted wild animals. These varied strategies frequently coexisted for centuries. Some researchers have even suggested that cultivation may have initially been nutritionally inferior to foraging and that societies turned to it only when climate change or population growth forced it. The work of these researchers has led some theorists to argue that we should focus less on “domestication” as a moment of dramatic change than on the slow changes and continuities of food collection and production over long periods of time. By focusing on the slower changes, these theorists hope to give us a more complex picture of how and why people adopted, adapted, or rejected certain plants and techniques.

While definitions are still in flux and debates over evidence are wide-ranging, however, archaeobotanists have been able to use the evidence they have uncovered to propose dates for the domestication and importation of major plant resources in the African past. Their analyses generally support the idea of a long Mesolithic period (meso = middle: thus, the Mesolithic was a middle period between Paleolithic foraging and Neolithic coexistence with domesticated plants and animals). In Egypt, for example, grindstones and sickle blades dating as far back as 16000 b.c.e. have been found, suggesting intensive gathering of wild grasses at that time but without any accompanying evidence that they were domesticated instead of merely gathered. In fact, the first African domesticates were probably not plants but cattle, which may have been actively herded and domesticated in North Africa as early as 8000 b.c.e. Pastoralism spread rapidly into the Sahara as well, which at the time was rather wetter than it is today.

Plant domestication in Africa probably came much later as the world entered a dry period and humans in Northern Africa were squeezed into river valleys and other still wet zones. Pearl millet may have been the earliest indigenous plant domesticated in Africa, beginning around 2000–1500 b.c.e. in the Mauretanian savanna (see Figure 1.1). However, this likely occurred after the diffusion of wheat, barley, and other Mediterranean crops from the Fertile Crescent of Southwestern Asia into Egypt, possibly between 7000–5000 b.c.e. Two other important local crops, sorghum and African rice, may have been domesticated in the band south of the Sahara sometime in the first millennium c.e. Meanwhile, pearl millet probably crossed from the savanna into the forest zones of Western Africa rather rapidly (1500–1200 b.c.e.) and was later joined by staples such as yams (from Western Africa). As cultivation techniques spread across the forest zones of Central Africa, these imports were added to local crops such as finger millet and enset, a relative of the banana, in east Africa. In Ethiopia, similarly, a diverse cultivating menu existed by 500 b.c.e. including imported barley and wheat as well as local species of oats and the tiny seeds known as teff. Bananas were imported from Asia, possibly through Ethiopia, either around 500 b.c.e. or a
thousand years later. Finally, domesticated maize was brought from the Americas by Europeans starting about the sixteenth century; it has become one of the most important African crops today.

Dating the origins and tracing the movement of wild and domesticated plants is only the first task of archaeobotany. A second goal is to begin to connect plant cultivation and domestication with human culture. For example, the production and consumption of parts of plants has had important repercussions for human material culture (Figure 1.2).

Most of the early possessions made and used by humans were related to the gathering, preparation, and storage of food, whether involving bowls, cups, sickles, or mortars and pestles. In addition, archaeobotanical evidence can help us to understand how past societies operated in terms of nonmaterial culture. Evidence for different production work spaces may suggest separate roles for men and women. Evidence of different consumption patterns in a society may imply hierarchies in which the rich or powerful ate different food than the common people did. The existence of communal storehouses or specialist production may suggest specific modes of social organization. Even rituals and pageants can be seen at times in the plant material trash or castoffs of past societies. Of course, this evidence is enhanced when used in conjunction with linguistic analysis (Chapter 4), other forms of archaeology (Chapter 3), and oral and written texts. In such combination, archaeobotany can help us to understand not only human societies’ life stories and the movements of plants but also decisions to adapt, adopt, refuse, and use and distribute plant resources in specific ways.
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THE METHOD

The practice of archaeobotany involves three steps: fieldwork, laboratory analysis, and the interpretation of findings. The first step—the collection of data in the field—is similar to archaeological fieldwork and is discussed in Chapter 4 of this book. The second step—laboratory analysis—involves a set of highly specialized and technical scientific skills. Both require many years of study and often the collaboration of a diverse team of experts. For the nonspecialist hoping to use archaeobotanical findings in combination with other sources, such intensive knowledge is not necessary. However, to use this field of work, it is important to have a working knowledge of its advantages, pitfalls, and limitations. In the final step—interpretation—historians and social scientists become the most involved. The remainder of this chapter will further explain the different steps involved in the study of archaeobotany.

The process of archaeobotanical research begins with the search for a set of evidence containing plant cultivation and suggesting domestication, processing, and consumption. Once a site has been located, the next task is to carefully collect samples of plant material. This alone is often difficult because plant remains are often small and frequently decay rapidly, leading one scholar to describe them as “remains of low archaeological visibility.” Some plant remains that are visible to

FIGURE 1.2 Locator Map

the naked eye are usually termed **macro**, or large, remains. They include leaves, stem fibers, plant charcoal, and seeds. **Macroremains** are infrequently well preserved, usually only in dry areas such as the Sahara Desert or in other extreme contexts. A number of strategies for locating macroremains can be used, all of which involve various methods of sorting soil samples excavated from a site. Two such methods for separating the plant remains from soil and stones are sifting the material through a screen and using the flotation method by which the sample is exposed to water, allowing seeds, charcoal, and other light materials to float to the top. A third method is analysis of **coprolites**—the remains of human (and sometimes animal) feces and stomach contents, often recovered from well-preserved corpses.

Once a number of macroremains have been located, archaeobotanists attempt to identify, classify, and interpret them. An important part of this process with plants is looking at the remains’ **morphology**, or physical characteristics, in order to identify the plants. Plants are commonly divided into taxonomies: classifications that help to identify their relationship to other plants. One of these categories is **species**. Plants of the same species can interbreed with each other, although there may be variations within a species that are described as different **varietals**. A number of related species are usually grouped together as a **genus**. Genus names are usually capitalized. Plant remains are identified when possible by their genus and species. For example, African finger millet is *Eleusine coracana*.

As well as being identified taxonomically, many plant remains can be loosely dated using specialized techniques. **Radiocarbon dating**, also known as **carbon dating**, is a way to determine age by measuring the deterioration of different forms of carbon that exist in organic matter. Because these forms of carbon—or isotopes—deteriorate at different speeds, measuring their carbon levels can help date the remains. Some scholars remain skeptical about dates given for specific artifacts and remains; they point to the possibility of contamination by objects deposited near or around the remains. Others suggest that various organic remains might start with different levels of carbon isotopes than is generally assumed. Nevertheless, carbon dating is widely used, and its defenders argue that it can give relatively accurate dates.

Looking at the physical characteristics of plant remains can also be useful in identifying the place and time at which a plant species was domesticated. As they choose plants to reproduce in their fields, humans often search for certain plant characteristics. For example, the seedpods of most wild cereal grasses “shatter” in order to spread their seeds widely. This trait makes collecting the edible seeds difficult. Therefore, in domesticating grasses, humans often have selected nonshattering examples of the species and sown them for the next year. Evidence of nonshattering seedpods is thus sometimes used to date the domestication of cereals in various parts of the world.

However, the interpretation of macroremains from specific sites is problematic, limited, and common to archaeological remains in general. Carbon dating may be imprecise. Soil samples represent only a small portion of the site and may not include valuable data. Some remains may not survive in soil that is recovered by archaeologists. These problems are often especially pronounced in the case of fragile plant remains. **Differential preservation** among plant materials is intense. It is possible to miss the staple crop consumed on a site merely because it decayed easily in the soil.\(^{10}\) Similarly, in analyzing coprolites, the researcher must be aware that some plants are entirely broken down by the human digestive system and thus do not appear in feces or stomach contents. Seeds often survive digestion well while roots do not, possibly leading to an overrepresentation of cereals (containing seeds that humans consume) rather than tubers (whose roots humans consume) in some sites. Likewise, some plants make good charcoal remains while

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others are entirely destroyed by fires. Finally, it is difficult to prove domestication through plant morphology because the changes caused by humans are not always evident in the plant’s physical structure. Archaeobotanists have developed a number of methods to compensate for or overcome these limitations. Three interrelated methods are worth discussing here: pollen collection, DNA analysis, and the interpretation of opal phytolith (defined later).

The first of these strategies is the collection and interpretation of pollen, the powderlike male reproductive cells of flowering plants (see Source 1.4). Because pollen distributes itself widely and often survives quite a long time, studying it enables archaeobotanists to identify many plants that are otherwise missing in the archaeological record. Most pollen collection techniques involve refining the sampling strategies developed for macroremains to catch smaller particles. Pollen can be found, for example, in soil samples and coprolites. Another strategy is to analyze the remains of sticky substances, such as the residues of glues, resins, and food substances stored in pots or applied to materials, in which pollen has become trapped. Especially useful is any substance that contained honey, which is not only sticky but also made from pollen.11

Source 1.4

Pollen from Important Sahelian Crops, 1995–2005

(a) Sorghum  
(b) Baobab  
(c) Watermelon

Source: Images from the African Pollen Database:


As we see in this section, by looking at the combination of different types of pollen in honey and in substances processed by humans, researchers can sometimes learn about social and cultural practices. Another way to interpret pollen remains is to try to reconstruct the density of the plants from which they came as evidence of domestication or intensive production of particular plants. Unfortunately, this technique has not yet been developed sufficiently to convince most scholars. On the other hand, the DNA of pollen along with other plant remains is being analyzed to reveal evidence of human–plant interaction.

Most of us are familiar with DNA (deoxyribonucleic acid), the material in plant and animal cell structures that carries genetic information from one generation to the next and contains instructions for building organisms. Paleoethnobotanists extract DNA from plant remains by using a variety of complex processes and are then able to analyze it to help construct the species’ histories. Paleoethnobotanists’ chief concern is charting and interpreting mutations that develop in cellular DNA over time. In some cases, the wholesale spread of certain mutations through a species may be evidence of the plant’s human domestication, as in the selection of nonshattering over shattering cereals described previously. The principal tasks in this case are to identify which genes are important in causing this change and then to test specific remains to see when and how the gene mutated to become more useful to humans. At other times, it is possible to trace the movement of both wild and domesticated species in order to identify how species and varietals spread from one area to another. This information can provide evidence as to the migration or purposeful importation of useful species from one place to another.

However, various factors limit the usefulness of DNA analysis. One is that DNA, even from well-preserved samples, can be contaminated by molds and fungi that develop on plant remains. Another factor is that scientists are able to recover only partial samples and thus miss a great deal of data. Other limitations occur in the interpretation rather than the collection of DNA. For example, it is not always possible to link domestication to specific changes in a plant’s genotype, or genetic code. Additionally, because domesticated and wild strains of a species might interbreed multiple times over a long period, tracing specific genetic mutations can be difficult and confusing. Nevertheless, DNA analysis has provided much of the information on which our understanding of plant movement and the long-term effects of human use of plant species is based.

Unfortunately, DNA analysis cannot also be used on opal phytoliths, a relatively new but increasingly important source of information for vegetation history. Phytoliths are, essentially, the fossils of plant cells (see Source 1.5). They are formed when silica taken in by a plant from the water it drinks is left behind in the shape of the cell after the organic material has degraded. The resulting casts are three-dimensional copies of the original cell, which archaeobotanists can recover from soil samples at the sites where the plants were grown or used.

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14 Ibid., 12–13.
Phytoliths have at least two advantages over other types of plant remains. First, they allow researchers to work in conditions adverse to pollen preservation. Second, they provide evidence of the cultivation and consumption of root crops whose pollen and seeds would not likely have been present at sites of human habitation. The presence of phytoliths in a particular layer of an
archaeological site can tell us when certain crops (especially root crops) were introduced. The phytoliths of many domesticated crops are distinctively different from those of wild varietals, so they can be useful in pointing to evidence of domestication. In some cases, such as that of bananas, the evidence of domestication is not conclusive. In other cases, there is no evidence at all that domestication can be tracked through phytoliths.

THE SOURCES

The Spread and Use of Bananas in Africa

Bananas are not indigenous to Africa, yet today they form a staple crop for a wide swath of tropical African societies. Recent research has concluded that edible bananas (genus *Musa*) were among the earliest crops domesticated far across the Indian Ocean in New Guinea. But how and when did bananas get to Africa? This is a question of great importance not just because it bears on African agricultural practices but also because evidence of such wide-ranging interaction might bring into question assumptions about the antiquity of Africans’ interaction with other parts of the world. Until recently, evidence from written sources, linguistics, and archaeology led to a consensus among scholars that bananas did not arrive in Africa until around the fifth century C.E. (1500 years ago), when they were brought by “[p]eople of Malaysian-Indonesian descent” via Madagascar. In the words of one researcher,

> It is likely that they brought with them bananas, *Musa* . . . , which later spread to Africa where they became of the greatest importance as the staple food of the Baganda and others. They spread into the heart of the continent via the Zambezi valley and the great lakes and then across the Congo to West Africa, where they were found by the earliest Portuguese explorers.

Over the past one and one-half decades, however, the development of new archaeological techniques, particularly phytolith analysis, has led a number of researchers to question this argument. Led by Christophe M. Mbida, these researchers claim that the apparent absence of bananas from the archaeological record before 500 C.E was merely a result of its low archaeological visibility: “the [domesticated] banana plant does not produce pollen. . . . [t]he tissues of the stipes or roots . . . have never been found as macrobotanical remains due to the extremely poor preservation chances.”

The development of phytolith analysis has made finding remains of plants such as bananas much easier. As a result, banana phytoliths have recently been recovered in relatively well-preserved condition from archaeological sites as widely dispersed as Nkang in Cameroon and Munsu in Uganda. In Nkang, banana phytoliths were first found in ancient refuse pits exposed by new roadwork cutting through an embankment. A group of archaeologists including Mbida had sifted and sorted the contents of these pits and investigated both charcoal remains and residues found in pottery fragments. In a paper detailing their research, they reported that they had found

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a number of banana (*Musa*) phytoliths within charred organic matter that they dated back to the first millennium B.C.E. (1000–1 B.C.E.) and argued in “very conclusive” findings that bananas had existed in this region of Western Africa thousands of years earlier than previously thought.  

The group’s findings, if confirmed, may revolutionize our understanding of the antiquity of Afro-Asian interaction and the spread of domesticated crops in Africa. However, some scholars have written skeptically of these findings. They include the anthropologist Jan Vansina, whose work on this topic is highly regarded. At dispute is not only conflicting linguistic and oral tradition but also whether the phytoliths they found are banana (*Musa*) or are actually the remains of a related plant indigenous to Africa, the *Ensete*.

Because phytoliths were the evidence at the center of this dispute, it is up to the archaeobotanists to explore the similarities and differences between *Ensete* and *Musa* phytoliths. Several years of further debate and research have followed the initial findings at Nkang, and most researchers now agree that it is possible to tell the two apart. As electron images (Source 1.5) and renderings (Source 1.6) show, the phytoliths produced by both plants appear as a base surmounted by a raised cone with a crater. However, the *Musa* cone is more concave and the crater within it is more saddle shaped than that of the wild *Ensete*. The musa base also commonly sports a number of protuberances. The whole body as seen under electron microscopes appear to have small warts, but they are not seen through optical microscopes. By contrast, African *Ensete* phytoliths “seem to possess a base without protuberances, a cone with convex slopes . . . and [wartlike] sculpturing visible under both optical and [electron] microscopes. Furthermore, the crater is flat (i.e. not saddle-shaped), without crenations but with two to three possible indentations.”  

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**Source 1.6**

**Comparative Morphology of *Musa* and *Ensete* Phytoliths, 2005–2006**

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*Sourced from Melina A. Zeder, Daniel G. Bradley, Eve Emshwiller, and Bruce D. Smith, Eds., Documenting Domestication: New Genetic and Archaeological Paradigms, © 2006 by the Regents of the University of California. Published by the University of California Press. Reprinted by permission.*

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It seems likely, therefore, that the finds at Nkang are evidence of bananas (*Musa*) at an earlier date than previously thought. Moreover, additional finds of *Musa* phytoliths controversially dated as far back as the fourth millennium B.C.E. in Munsa, Uganda, support this theory. These finds might have linked the ancestral home of bananas in Asia and New Guinea with Nkang in Western Africa. However, this interpretation is problematic. One issue is that no banana remains have been found between the two sites. This may be due to lack of research or existing evidence. Additionally, there is not yet sufficient evidence of voyages connecting Africa and New Guinea in this early period. Thus, although carbon dating of elements of the soil matrix in which the *Musa* phytoliths occur seems to indicate an early date for bananas in Africa, there is as yet no evidence to corroborate these data. Instead, analyses of oral histories (Chapter 9) and linguistics (Chapter 3) seem to imply a later date for the introduction of bananas. As a result, the theory of early introduction of bananas to Africa is still subject to debate.

**Wine and Beer in Pharaonic and Roman Egypt**

Egypt is probably the place most often associated with early food production and processing on the African continent. Evidence of the campsites of foragers dating back about 20,000 years has been recovered from the western desert of Egypt, and Egyptians could have begun to domesticate cattle as early as 8500 B.C.E. Yet although macrofossil remains show that these groups collected and processed indigenous wild tubers and sorghum, the first domesticated plants in what is Egypt today appear to have been barley, wheat, and other cereals introduced from Southwest Asia (Mesopotamia), probably around 5500 B.C.E. The context was the fertile Nile River Delta whose geomorphology and rainfall levels during that time were especially suited for the cultivation of these Mesopotamian crops. These crops were combined with African cattle and later local plant domestication into a wide and rich Egyptian diet well before the gradual unification of the Egyptian state under the first Pharaonic Dynasties discussed in Chapter 2 (ca. 3500–3000 B.C.E.).

Among the staple foodstuffs made from these domesticated plants were unleavened crackers and breads that took advantage of natural yeasts, but many scholars of early Dynastic Egypt believe that the most nutritionally significant foodstuff for most of the Egyptian population of this period was a type of low-alcohol beer made from loaves of wheat, barley, sorghum, and/or millet bread fermented in water and flavored with fruits and barks. Wine was also consumed from around this period and appears to have been introduced to Egypt around 3100 B.C.E. from Greece or Southwest Asia. Is it possible to reconstruct a history of these two beverages and to understand their relationship to Egyptian culture and society in this and later periods?

Even without archaeobotanical research, quite a bit of evidence about beer and wine in earlier periods of Egyptian history is available. Documents and inscriptions written in hieroglyphics and, later, Coptic texts depict the task of beer production and the act of consumption. Archaeologists have also found pottery and other remains of these processes that have been

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22Ibid., 109–11.


exposed to chemical analysis. Archaeobotanical analysis of these residues adds a great deal to the other sources of information, as several studies show.

The first of these new archaeobotanical studies was conducted in the 1990s on beer “residues” collected from an excavated site at Hierakonpolis (Upper Egypt), ca. 3500–3400 B.C.E. \(^{25}\) Macroremains analysis of these residues led to the recovery of wheat, barley, date, and grape fragments. By analyzing the remains for chemical components, the researchers were also able to propose a model of the processes by which naturally occurring and/or purposefully added micro-organisms converted the ingredients into a staple prepared food of enormous nutritional value and to show that these techniques could be mastered by home cooks.

These findings among others point to beer as a widely produced and commonly consumed beverage in the homes of the poor and middle class of Egypt. By contrast, wine consumption appears to have been reserved to an elite upper class and to have been used for funerary and religious purposes rather than in everyday consumption, at least in the period of the early dynasties. Certainly, this is the impression given by written records and archaeological findings in tombs. Yet this information may be distorted by the fact that both of these sources are skewed toward the wealthy classes who dominated writing and had large tombs built for them. Archaeobotanical research is helping to address this issue through the analysis of the contents of jars recovered from a variety of settings including some associated with lower-class Egyptians. The jars, or *amphorae*, may have contained any number of substances. In several studies, archaeologists searched residues in these jars for fragments of grape seeds, stems, and skins in the hope that finding them would confirm that the jars contained wine. Ironically, however, other researchers have suggested that such macroremains would indicate that raisins rather than wine, which is usually filtered for such large materials, were stored in the jars. This research has not yet confirmed whether wine consumption in this early period was confined to elite classes or also enjoyed by the lower classes, but in combination with other evidence might help to resolve this issue. \(^{26}\)

A study of pollen recovered from wine jars dated to the fourth through seventh centuries C.E. has also revealed important information about the production of the beverage and, by extension, socioeconomics in Egypt under Roman and Byzantine rule. The researcher, Manfred Rösch, analyzed five vessels from a site named Šaruma, looking for evidence of pollen trapped in sticky residues. \(^{27}\) He found three containing large samples of pollen, which he analyzed to determine their species. The most prevalent were *Vitus* (grape) and species of the Brassicaceae family (leafy plants including cabbages and lettuce as well as many nondomesticated plants, all of which are primarily fertilized by bees and other insects; see Source 1.7). Other species were represented by only a very small number of pollen grains.


\(^{26}\) M.A. Murray, “Wine Production and Consumption in Pharaonic Egypt” in *The Exploitation of Plant Resources*, ed. M. Van Der Veen, 163.

Rösch’s findings from this evidence have various levels of bearing on social practices of the period. For example, he attributes the presence of *Vitus* to the fact that grape pollen often remains on the grapes in Egypt, where there is little rain to wash it off. But his analysis of the Brassicaceae pollen is more complex. Because Brassicaceae species are fertilized by insects, their pollen is not airborne. How, then, would its pollen have found its way into the vessels? Rösch concluded that their presence is evidence that honey, which often contains large amounts of pollen, had been added to the wine. Moreover, because so few species of plant were represented in the residue, he argued that this honey was not wild but the result of a careful beekeeping process intended to yield large amounts of honey from agricultural fields. Thus, his findings may be evidence of how a specific, sophisticated human-animal-plant relationship worked in Egypt in this period.
Chapter 1 • Archaeobotany and Cultivation in Africa

Exercises

EXERCISE 1: EXPLORING THE DOMESTICATION OF SORGHUM

Sorghum appears to have been an important wild crop for foragers in Africa and possibly parts of Asia. It has also been an important domesticated crop for African farmers in many parts of the continent. But the place (or places) at which sorghum was first domesticated remains disputed at least because there are many different species of cultivated sorghum, some (such as *durra*) that may have entered Africa from Asia, and others (such as *bicolor*) that appear to have been domesticated in Africa.

In general, there are three broad theories for the original domestication of sorghum. The first is that wild sorghum originated in Africa but then entered Asia where it was domesticated either in India or Mesopotamia. A second theory, put forward by Jouke Wigboldus, suggests that domestication took place in Northeast Africa but quite late in history (1–1000 C.E.). A third theory is that sorghum was first domesticated in Africa but at a much earlier date.

Answer the following questions regarding this debate:

1. Supporters of the theory of Asian domestication of sorghum must first prove that sorghum existed on the continent at an early date. Their evidence for the period prior to 1 C.E. so far consists of an impression (indentation) in a brick dated to before 1 C.E. that appears to be a small piece of a sorghum seed, a drawn motif on a pot sherd dated to before 1 C.E., and a number of seeds recovered from an ancient site in India. The seeds were recovered from a layer deposited around 2000 B.C.E. The layer was later built over by peoples in the early first millennium C.E. (ca. 1–200). These groups may have dug trash pits into the earlier layers. To what degree do you think this information is sufficient to establish the presence of sorghum in the region prior to 1 C.E.?

2. Subsequently, an archaeological team has carbon-dated 24 of the seeds found at the Indian site (discussed in the introduction to Exercise 1) to 2000–1700 B.C.E. Given what you have read here about carbon dating techniques and limitations, discuss whether you are convinced that this is sufficient evidence to prove that wild sorghum existed in India in this early period.

3. In support of the theory that sorghum was domesticated at an early date in Africa, researchers have found impressions of sorghum in mud in Sudan (Northeast Africa) dating to about 3000 B.C.E. These impressions are merely indentations giving the shape of the head of a sorghum stalk (including the seeds) that has long since deteriorated. How can this simple bit of evidence help us to understand whether this sorghum was wild or domesticated? What would researchers need to know about wild and domesticated sorghum before looking at the impression in order to make a determination?

4. If you were going to design an archaeobotanical study to test Wigboldus’ thesis (of a late date for sorghum domestication in Africa), what types of evidence would you look for, and where?

EXERCISE 2: INTERPRETING ARCHAEOBOTANICAL DATA

5. Iliffe argues that “human coexistence with the environment” is a key theme in African history. What do you think he means by this? How does the environment shape human societies? How do humans shape the environment? Try to give examples from your own knowledge.

6. Based on the information in this chapter, what are the “limits” of archaeobotanical data and interpretation in telling us about past human societies? What can this type of research not tell us at this time?

7. The phytolith data on bananas in Cameroon and Uganda seem to contradict evidence from oral sources about the origins of bananas in Africa. Do you think that these “scientific” data are more reliable in this case than are oral traditions passed down through the generations? Why or why not?

8. Why might it be important to scholars to learn about the processes by which beer or honey-laced wines were made in early Egypt? Why might it be helpful to know whether only important, elite classes drank wine or whether all classes used it in specific periods?

9. Based on the definitions given in this chapter, what is the difference between *cultivation* and *domestication*? Why do some scholars suggest a “long Mesolithic” period in many parts of Africa, and what are the implications of this argument?
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Further Reading