HANE / M – Vol. XIV

History of the Ancient Near East / Monographs

Editor-in-Chief: Frederick Mario Fales

Editor: Giovanni-Battista Lanfranchi

ISBN
978-88-95672-11-3

A publication grant from
the Italian Ministry for University and Research (M.I.U.R.)
is acknowledged for this volume

Via Induno 18B, I-35134 Padova
SAR.GON@libero.it
Prima edizione: Padova, marzo 2014

Distribuzione* / *Distributed by:
CASALINI Libri S.p.a., Via B. da Maiano 3, I-50014,
Fiesole – Firenze http://www.casalini.it

Eisenbrauns, Winona Lake, Indiana 46590-0275 USA
http://www.eisenbrauns.com

Stampa a cura di / Printed by:
Centro Copia Stecchini – Via S. Sofia 58 – I-35121, Padova

History of the Ancient Near East / Monographs – XIV

PALEONUTRITION AND FOOD PRACTICES IN THE ANCIENT NEAR EAST

TOWARDS A MULTIDISCIPLINARY APPROACH

Edited by
LUCIO MILANO

in cooperation with
Francesca Bertoldi

S.A.R.G.O.N. Editrice e Libreria
Padova 2014

TABLE OF CONTENTS

Food for Travelling: Investigating Travel Provisions in the Ancient Near East

Food Economy, Technology and Symbolism

FOOD PREPARATION AND CONSUMPTION ON LATE PLEISTOCENE / EARLY HOLOCENE SITES IN THE NEAR EAST: EVIDENCE FROM PLANT REMAINS AND ARCHAEOLOGICAL FINDS

George Willcox

Food procurement is one of the two most fundamental preoccupations for animals, including humans, the other being reproduction. Yet, for many human societies food represents much more than just satisfying a biological need. It is an important part of the social fabric of communities, uniting biological necessity with social and belief systems. Archaeobotanical and archaeozoological analyses provide information about the diet of prehistoric peoples. The social role of food as opposed to just diet itself can be interpreted when we confront archaeological evidence with that obtained from plant and animal remains.

In this paper we will try to assess how plants were used for food and what social role food and food preparation might have played during the pre-Neolithic and early Neolithic periods in the Near East. For many taxa identified as part of archaeobotanical assemblages it is not possible to know with certainty if they were used for food, or whether they were brought onto the sites for other purposes such as combustibles or even just accidentally on clothing, by wind, in the guts of butchered animals. Interpretational common sense is important; for example, if we find strawberry seeds on an archaeological site, this does not prove that strawberries were eaten on the site. On the other hand, to give prehistoric peoples the credit they deserve, if they brought strawberries into habitation areas it is highly probable they did so, because they were an appreciated source of food. For edible plants such as fruits, pulses and cereals there is little doubt that when they occur on archaeological sites it is because they made up part of the diet. For other plants, such as those used in flavouring (herbs or spices) which might be rare, or others like small seeded grasses and chenopods which could be weeds, we cannot always be sure they were consumed or whether they arrived accidentally on the site. In this article we will assume that most taxa found on sites which are edible and thus have potential use as food were indeed intentionally brought onto the sites for consumption. We will go one step further and consider some potentially interesting Near Eastern plants which may not have left any trace in the archaeobotanical record but were available in the vegetation and may have been used.

Availability is an important factor affecting plant gathering and hence plant use. So in the majority of cases humans relied for their everyday subsistence survival strategy on plants that are easily gathered not far from settlements. However a preference for some unusual plants highly valued for their taste, medicinal or colouring properties may lead to the collection of plants which pose considerable

difficulties for their procurement. These kinds of commodities may develop rarity value and become greatly sought after.

Taphonomic factors affect the plant record on archaeological sites. Poor preservation of plant materials accounts, at least in part, for the low level of information with regard to the plant economy on pre-agricultural sites. In most areas of the world favourable to human occupation, decomposition of plant material is extremely rapid. Occupation sites where plants become waterlogged or mineralised are rare. In the Near East archaeological deposits are biologically active, leading to decomposition of organic matter. Microscopic plant remains such as pollen and phytoliths may occur in archaeological deposits, but they are difficult to identify and date and are also prone to mobility through natural agents such as burrowing animals (wasps, earthworms and rodents), percolation, and roots. Charred plant macro-remains represent materials, including food plants, which were brought onto the site; these remains can be reliably identified and occur on most Near Eastern sites. Charring produces a high level of bias so the archaeobotanical sample cannot be seen as representative. Leaf and stem remains rarely survive. Seeds high in starch resist burning while those high in oil burn more easily. Despite these limitations archaeobotanists are able to provide quite detailed information concerning how different plants were used.

Information on Lower, Middle and Upper Palaeolithic diet comes mainly from animal bones, because for these periods bones survive, while plants even when charred rarely survive. So what was the role of plant foods for these ancient hunter/gathers? In order to help answer this question we have knowledge obtained from studies of extant hunter/gatherers. Accepting the pitfalls of ethnographic parallels, there are some broad generalities which appear to be common to most hunter/gatherer groups and will allow us to speculate about plants gathered by extinct hunter/gatherers where no material remains exist. Most hunter/gatherers, as opposed to agriculturalists, depend to a great extent on meat for their overall nutritional intake. The plants they use have a much higher diversity, because they use a greater number of species, than those used by farmers, and these gathered plants may come from a wide range of habitats. Many hunter/gatherers have an extensive knowledge of a wide variety of plants and can recognise a very large number of different species. They may encourage reproduction of useful plants in their wild habitats without being fully-fledged cultivators. In this way plants species are not over-exploited. The plants they gather may be used for a wide variety of uses apart from food, such as colouring, drugs, medicine, fibres, rituals etc. Unfortunately, if Palaeolithic societies did use plants in this way and it is probable they did, it is highly unlikely that any trace would survive.

The earliest finds of plant foods in the Near East come from the Acheulian site of Gesher Benot Ya'aqov where acorns (*Quercus*), pistachio nuts (*Pistacia atlantica)*, water chestnut (*Trapa natans*), and seeds of prickly water lilly (*Euryale ferox*) were found with wood charcoal from wild almond trees (*Amygdalus*) (Goren-Inbar *et al.* 2002). Archaeological evidence found on the site in the form of hammer stones with pitting suggests that these tools were used to break the nuts and process these plants. Further processing may have been needed to remove cyanic acid which is found in some wild almonds. We do not know how important a role these plants played in the diet of the hominid occupants of this site, which is dated to the early/middle Pleistocene. It is significant that the three tree species, oak, almond and pistachio, were commonly used during later periods by *Homo sapiens*, and that the aquatic plants have been found on a wide range of sites stretching from China to Europe during the Pleistocene.

The earliest Upper Palaeolithic evidence for diet from the Near East was found at the Kebaran site of Ohalo II situated on the shores of the Sea of Galilee and dated to about 20,000 year ago (Kislev – Simchoni – Weiss 2002). At this site several hundred well preserved charred seeds and fruits were recovered, including grains from two wild cereals. Faunal remains also indicate that a wide diversity of animals were exploited, including high proportions of small mammals and fish. Ohalo II is the

earliest site, at the time of writing, which has produced progenitors of the founder crops. 629 grains of wild barley and 21 grains of wild emmer were identified, together with 9 spikelet bases of emmer and 30 rachis nodes of barley. This site, which was occupied during the last glacial period, is the only site to have provided a well preserved rich archaeobotanical assemblage. Grinding stones were also found at Ohalo II, suggesting cereal processing. Epipalaeolithic sites in the southern Levant indicate that a large number of small animal species were exploited for food at this time. Comparisons between the different Palaeolithic periods are difficult because the sedimentary conditions and preservation of both plant and animal remains are so variable. Indeed the high diversity increase of the so-called broad spectrum revolution is based on absence in earlier periods but in fact the diversity increase may result from more favourable conditions of preservation and better recovery methods used on the later sites.

Early Natufian sites concentrated in the southern Levant occupied a region which between the end of the last Ice Age but prior to the Younger Dryas climatic episode was rich in natural food resources. There was an abundance of wild grasses, almonds and wild pistachio. The late Natufian period, which corresponds with the Younger Dryas, may have been less favourable but in the southern Levant wild cereals continued to be available. It is probable that these rich natural resources allowed these late Palaeolithic societies to abandon a nomadic way of life and occupy permanent settlements. The transition from nomadic societies to sedentary ones is poorly understood, and was probably a complex drawn-out process that resulted from multiple and changing socio-environmental factors which spanned a considerable period of time (Boyd 2006). The ability to store food on a large scale may have been a precursor to the transition towards permanent settlements. Grain crops such as wild cereals and wild pulses lend themselves to storage, and are in fact pre-adapted to storage. Other resources such as pistachio nuts and almonds could also have been stored. Unfortunately concrete evidence for storage structures is not forthcoming, although pits discovered at Mallaha have been cited as being probably used for storage. Given the high yield and large quantity of grain available in wild stands at this time and the ease with which they would have been harvested, storage would be the logical option.

Few would disagree that Early Natufian sites represent the earliest known permanent settlements and that they had storage facilities. This way of life would allow important changes in both food preparation and eating habits. Wild cereals and pulses are only harvestable during a few weeks at the end of spring (gathering fallen spikelets from the ground will not be considered here) which means that without storage these plants would only occupy a small part of the annual dietary cycle. But because large quantities of grain can be gathered in a relatively short space of time it is reasonable to assume that storage for future meals (perhaps throughout the year) would have been a natural option for gatherers of wild cereals. When nomadic hunter/gatherers first started to store wild cereals this practice would have paved the way towards the development of permanent settlement because gatherers would have returned to places of "permanent" storage. Construction techniques would have been developed to build appropriate structures to protect stored grain against moisture and attack from rodents, insects, birds etc. So the transition to permanent settlement with constructed dwellings probably evolved in parallel with the adoption of constructed storage structures for wild cereals. These structures would be dependent on innovation of building techniques. When permanent settlement and grain storage on a large scale became the norm, humans could rely on a regular sustainable supply of food from a small number of plant species throughout the year. This dietary security would liberate societies from the daily chores of gathering. Indirect evidence for storage comes from finds of domestic mice found during the Late Pleistocene (Cucchi – Vigne – Auffray 2005), by the tenth millennium charred small rodent droppings become common (Willcox – Fornite – Herveux 2007). This new way of life would have a profound effect on societies and on food processing and eating habits.

With permanent settlements and storage, access to food would become much less dependent on the seasons. Inhabitants of villages would consume the same food derived from stored grains every day throughout the year. Large quantities of stored grain would have given these gatherers more time to gather rare and unusual plants throughout the year. This may have allowed them to experiment with the use of condiments for flavouring, in order to vary taste and avoid a monotonous diet based on cereals.

Late Pleistocene Natufian gatherers gradually adopted a sedentary way of life. As they did so their diet would have come to rely more on stored food. Cooking may have evolved and become more complex. The elaborately carved stone mortars found on Natufian sites which were used to process grain, indicate how these societies were prepared to invest time in fabricating the tools associated with food processing.

Towards the end of the Pleistocene, Late Natufian sites become less frequent. This is generally seen as a decline of Natufian societies which coincided with a period of climatic deterioration with a return to glacial conditions (in northern Europe). This period, dated from about 11,000 to 10,300, is known as the Younger Dryas. However the causal relationship between societal decline in the Near East and climate change remains hypothetical. Climatic change would not have been the same right across the Levant but would vary depending on latitude and on altitude. Pollen evidence does not provide much evidence for a change in vegetation except at Lake Hula where there is a decline in oak forests (Bottema 1995; Meadows 2005).

Settlement patterns indicate that during the last glacial and up until the end of the Younger Dryas sites were rare in the northern Levant. Abu Hureyra and Mureybet, which coincide with the Younger Dryas, are exceptions. At the beginning of the Holocene more sites appear in the northern Levant with a few dated to the Khaimian and more appearing during the PPNA. The latter are common along the middle Euphrates and possess the earliest evidence for complex architecture. The sites on the Euphrates were inhabited by hunter/cultivator societies. Other sites farther north such as Göbekli Tepe and Halan Çemi (Savard – Nesbitt – Jones 2006) provide little evidence that the inhabitants were cultivators.

Turning now to the tenth millennium sites in the northern Levant, we will discuss evidence which is common to sites such as Jerf el Ahmar (Stordeur 2000; Stordeur *et al.* 2000), Dja'de (Coqueugniot 2000), Tell 'Abr (Yartah 2004), Mureybet (PPNA) and Tell Qaramel (Mazurowski 2004). A recent report presents the archaeobotanical finds from these sites (Willcox – Fornite – Herveux 2007). Their location is given in Fig. 1. Taken as a whole, these early Neolithic sites provide evidence that they made up a cultural unity with complex belief systems and a complex social structure (Schmitt 2006). Their symbolic world was derived from images of wild animals (Stordeur 2000; Helmer – Gourichon – Stordeur 2004). It is probable that eating habits involved practices such as: 1) feasting, 2) elaborate food preparation, 3) consumption of medicinal and mind-altering plant products, 4) the use of flavouring (herbs and spices) and 5) diffusion of food plants through trade and exchange. In order to attempt to assess possible evidence for these practices we have taken five categories which we will assess separately.

1) *Food preparation areas*. The exceptional find of a kitchen destroyed by fire at Jerf el Ahmar, 9,500 BP non cal., is one of the few examples where food processing tools *in situ* were unearthed in association with charred food plant remains (Willcox 2002). The most astounding aspect of this room is that it was totally devoted to food preparation. It contained three saddle querns, three stone basins about 75 cms in diameter, two large stone platters with a polished surface on one side (Fig. 2). There was also a hearth. Charred plant remains were sampled by the square meter in order that spatial analyses could be carried out. Rye/einkorn was associated with the querns together with the remains of a seed cake made up of crushed *Brassica* seeds (Figs. 3, 4, 5). The querns were presumably used for grinding flower but also possibly for grinding the *Brassica* seeds which may have been used to obtain

oil. The three basins were associated with high concentrations of barley. What does this room tell us about the eating habits of the inhabitants of Jerf el Ahmar? The kitchen was very cramped and the three querns, each set into a plinth or pedestal suggest that food was prepared on a large scale and that it was consumed in another place. Indeed the line of querns remind us of later finds from Egypt and Mesopotamia where milling was organised on a large scale and certain members of society were assigned this task. We know that the querns were used to mill grain because a large number of broken grains of einkorn and rye were found near the querns and these grains were broken prior to grinding (Willcox 2002). The two platters were also no doubt used for food processing. Unfortunately at the time of writing no residue analyses have been carried out. But we could speculate that they were used for hammering meat to tenderise it or for crushing *Pistacia atlantica* fruits to obtain oil. The compact seed cake that was found situated on one of the querns could have been the residue of processing the seeds for oil. Another find was charred barley, associated with basins, which suggests that the basins were used for soaking barley. Barley might have been soaked for a number of reasons. Fermentation springs naturally to mind. So were these basins vats? In order to ferment barley the starch would have to be transformed. The most common way of doing this is by malting. We found no evidence that the barley had germinated. The other question is the availability of yeast. Yeast could have been obtained from ash (*Fraxinus)* leaves. These trees grew not far from the site; this species was common among the charcoal samples. However none of this is strong evidence of brewing. Finally, it is interesting to note that barley and rye/einkorn were two distinct crops, each species occurring separately, unmixed, in different areas of the room.

2) *Remains of prepared food.* This type of find has been recovered from Jerf el Ahmar, Tell 'Abr (Yartah 2004), Dja'de and Tell Qaramel (Willcox – Fornite – Herveux 2007) dating to the tenth millennium. It is possible that similar finds occur on other sites but have not been recognized. Unfortunately at the time of writing, with the exception of the seed-cake from the kitchen at Jerf el Ahmar, none of these have been studied in any detail. We have observed that these remains fall into two basic types. Those that consist of crushed seeds (Fig. 6) bound together in a matrix, and those that are amorphous in nature and could result from the burning of very finely ground food (Fig. 7) but which may have fibrous inclusions. These finds could in the future, given the right kind of analyses, provide some specific results about food preparation during this period.

3) *Vessels and containers.* This is a vast subject and little interpretive work has been carried out. The most striking finds are the stone vessels from sites such as Tell 'Abr, Jerf el Ahmar, Hallan Çemi and more recently from Körtik Tepe (Özdogan – Basgelen 2007), where in addition to intricately decorated bowls, what are best described as beakers were also found. On the Euphrates sites similar finds are also quite common. They may have been imported, as the raw material, often chlorite or basalt, does not occur naturally in the region. The fabrication of these containers took considerable effort and time. This implies that they may have been used for special events and particular products, probably by particular members of society. The finds of the beakers is intriguing because the form strongly suggests that they were used as drinking vessels. These finds imply that food and drink had reached a certain level of sophistication and that some kind of ritual may have been involved in consumption.

4) *Cooking pits (also known as roasting pits)*. Large cooking pits are common to all the Euphrates sites. Those found at Jerf el Ahmar and also at other sites of the same period are of considerable size, often over a meter in diameter and located outside the buildings. They often contain a considerable number of burnt and heat shattered river pebbles used for cooking. The size of these cooking pits must reflect the quantity of food prepared at any one time, in other words they were used for cooking large amounts of food. There could be various reasons for this. Large hearths could have been used during times of feasting when a large quantity of food was consumed in a short space of time. Or alternatively they may have been used to prepare food for storage. Large quantities of meat would become available when an aurochs was slaughtered. If this was not consumed in a short space of time the meat could be

dried and/or smoked and then stored. We cannot know for the moment the exact use of these pit hearths but whatever the case their size implies that food was being prepared on a large scale either for feasting or for subsequent storage.

5) *Charred seed remains*. Charred seed remains reveal direct evidence of which plants were brought to the sites. It is only after interpretation that we can suggest a specific use or whether they were autochtonous or introduced. Many plants that were commonly used may not occur in the seed record, such as salad plants and other plants used for their leaves. The introduction of plants into an area can be identified when a taxon is absent from a sequence and then suddenly appears at high frequencies. On the tenth millennium sites on the Euphrates a number of introductions have been identified in this way where plants which are absent during the Natufian period at Abu Hureyra appear on later sites. This is the case for barley, emmer, naked wheat, figs, flax, horse bean, chickpea and perhaps others. The appearance and/or introduction of these plants imply diffusion. Here it is difficult to separate climatic influence from that of human impact. Figs for example may have come from the west or the south. Today they can grow naturally in the area but this was not case during the cool Younger Dryas. So did they spread naturally into the region or were they introduced by humans? Finds of figs are numerous on a number of early sites in the southern Levant where they were apparently used intensively at an earlier date than in the north. However they occur well away from their natural habitats, so even in the south it appears that figs and probably the cultivation of fig trees was spreading thanks to human contact over large distances.

Cereal introductions in the Middle Euphrates during the tenth millennium can in all probability be interpreted in much the same way as for the figs. Human preferences must have played an important role in the diffusion of these plants. In some cases they may have been affected by taste; when emmer was introduced it may have been a question of yield.

Unfortunately there is very little evidence for medicinal and psychoactive plants. This could be because these plants were not preserved or we do not recognise them. Alternatively, they were simply not used. Plants which have been found on early Neolithic sites in the Near East which belong potentially to this group include *Hysocyamus, Peganum harmala, Ephedra, Vitex agnus-castus, Amygdalus,* and *Ziziphora*. There are many other potential plants which grow in the Near East which have not been found. Here I mention just a few of the better known ones: *Mandragora officinarum, Datura stramonium,* and *Atropa belladonna.*

Plants used for flavouring are not common. But there are two which have been found, included in the above list, which have strong-tasting edible seeds. These are *Ziziphora,* which is very common on some sites such as Tell Qaramel and Halan Çemi and was apparently commonly used. Why it was not used at other sites may simply be that it was not available in the surrounding vegetation. *Vitex agnus-castus* was found at Jerf el Ahmar in a number of different samples; this plant has a strong flavour and can also be used medicinally.

Conclusions

Evidence for food, particularly plant food, is rare during the late Pleistocene. Early Holocene tenth millennium (PPNA) sites on the Euphrates such as Jerf el Ahmar were inhabited by societies of hunters who cultivated morphologically wild cereals and pulses. Hunting of wild animals, mainly large game but also birds and small mammals, was an important part of the subsistence economy. These tenth millennium Euphrates sites provide some interesting evidence for the cooking and the preparation of food. Cooking was already developing as a craft and food was prepared on a communal basis. Evidence for feasting is more difficult to establish but the cooking pits would appear to point to this. The kitchen at Jerf el Ahmar was a cramped place with a large number of kitchen utensils suggesting that food was prepared on a large scale. There was no room to consume the food in the kitchen so it must

have been served elsewhere. Martin Jones (2007, 135) emphasizes the role of food sharing in societies and how the kitchen is evidence for that. The food was prepared in intricate ways and flavour from aromatic plants may have been added. Evidence for the consumption of mind-altering substances and medicinal plants for this period is practically non-existent, save for that suggested by "ceremonial or ritual carved stone beakers and bowls" which are common on sites of this period and a few seeds of these plants.

We know that food plants were diffused during the tenth millennium; however it is not possible to know how this diffusion took place. Could it be that plant products were traded? The introduction of cereals and pulses between the mainland and Cyprus during the tenth millennium may have involved a long period when grain and other plant products were imported from the mainland prior to the establishment of farming societies. Plants were also introduced along the Euphrates.

Finally on a broader level we have seen that the start of farming involved important developments both in diet and food preparation. These went hand in hand with the growth of a more complex social structure resulting from the expansion of a production economy. It was this social development which profoundly affected how food was prepared and consumed.

BIBLIOGRAPHY

Bottema S. 1995, "The Younger Dryas in the Eastern Mediterranean", *Quaternary Science Reviews* 14, 883–891.

Boyd B. 2006, "Sedentism in Non-Agricultural Societies", *World Archaeology* 38(2), 164–178.

Coqueugniot E. 2000, "Dja'de (Syrie), un village à la veille de la domestication (seconde moitié du 9e millénaire av. J.C.)", in J. Guilaine (ed.), *Les premiers paysans du monde, naissance des agricultures*, Errance, 63-79.

Cucchi T. – Vigne J.D. – Auffray J.C. 2005, "First Occurrence of the House Mouse (*Mus Musculus Domesticus* Schwarz & Schwarz, 1943) in the Western Mediterranean: A Zooarchaeological Revision of Subfossil Occurrences", *Biological Journal of the Linnean Society* 84, 429-445.

Goren-Inbar N. – Sharon G. – Melamed Y – Kislev M. 2002, "Nuts, Nut Cracking, and Pitted Stones at Gesher Benot Ya'aqov, Israel", PNAS 99(4), 2455-2460.

Helmer D. – Gourichon L. – Stordeur D. 2004, "À l'aube de la domestication animale. Imaginaire et symbolisme animal dans les premières sociétés néolithiques du nord du Proche-Orient", *Anthropozoologica* 39 (1), 143-163.

Jones M. 2007, *Feast: Why Humans Share Food*, Oxford.

Kislev M.E. – Simchoni O. – Weiss E. 2002, "Reconstruction of the Landscape, Human Economy and Hut Use according to Seeds and Fruit Remains from Ohalo II", in D. Nadel (ed.), *Ohalo II: A 23,000-Year-Old Fisher-Hunter-Gatherers' Camp on the Shore of the Sea of Galilee* (*Hecht Museum, University of Haifa Catalogue* 20), Haifa, 21–23.

Mazurowski R. 2004, "Tell Qaramel Excavations, 2003", *Polish Archaeology in the Mediterranean* XV, 355-370.

Meadows J. 2005, "The Younger Dryas Episode and the Radiocarbon Chronologies of the Lake Huleh and Ghab Valley Pollen Diagrams, Israel and Syria", *The Holocene* 15/4, 631- 636.

Özdogan M. – Basgelen N. 2007, *Türkiye'de Neolitik Dönem*, Istanbul.

Savard M. – Nesbitt M. – Jones M.K. 2006, "The Role of Wild Grasses in Subsistence and Sedentism: New Evidence from the Northern Fertile Crescent", *World Archaeology* 38(2), 179-196.

Schmitt K. 2006, *Sie bauten den ersten Tempel. Das rätselhafte Heiligtum der Steinzeitjäger. Die archäologische Entdeckung am Göbekli Tepe*, München.

Stordeur D. 2000, "New Discoveries in Architecture and Symbolism at Jerf el Ahmar (1997-1999 Syria)", *Neolithics* 1, 1–4.

Stordeur D. – Brenet M. – Der Aprahmian G. – Roux J.-Cl. 2000, "Les bâtiments communautaires de Jerf el Ahmar et Mureybet. Horizon PPNA Syrie", *Paléorient* 26, 29–44.

Willcox G. 2002, "Charred Plant Remains from a 10th Millennium B.P. Kitchen at Jerf el Ahmar (Syria)" *Vegetation History and Archaeobotany* 11, 55-60.
Willcox G. – Fornite S. – Herveux L.H. 2007, "Early Holocene Cultivation Before Domestication in Northern Syria", *Vegetation History and Archaeobotany* online, DOI 10.1007/s00334-007-0121-y.
Yartah T. 2004, "Tell 'Abr 3, un village du Néolithique précéramique (PPNA) sur le Moyen-Euphrate. Première approche", *Paléorient* 30/2, 141-158.

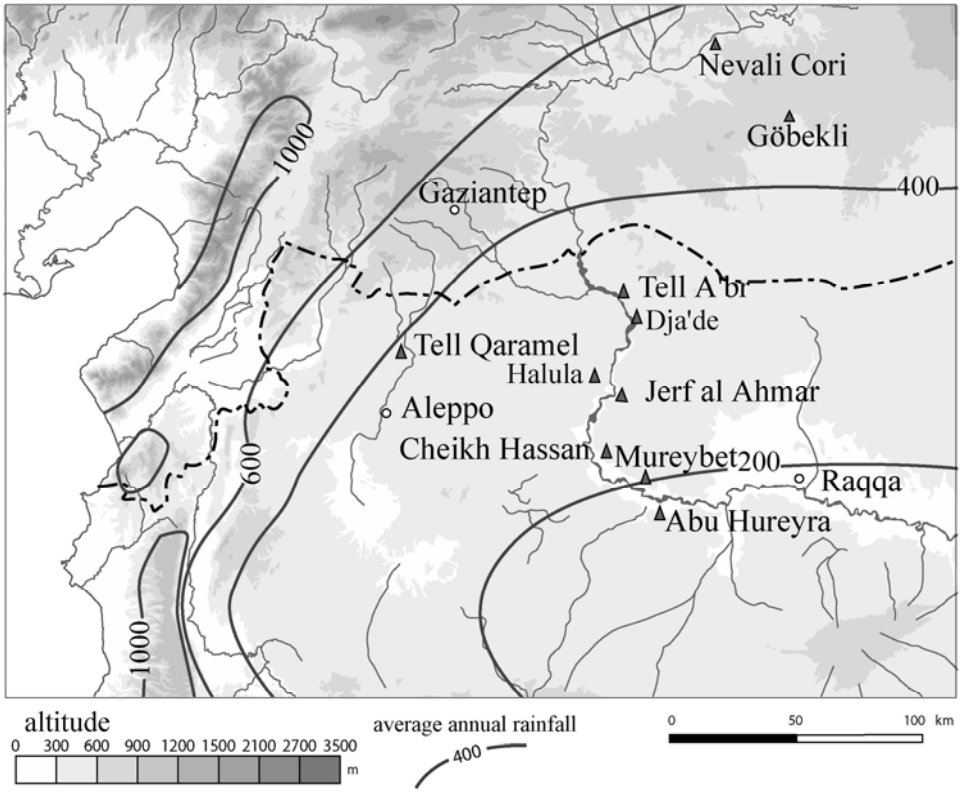

Fig. 1. Map giving the position of major late Pleistocene and early Holocene sites in the northern Levant.

Fig. 2. The kitchen at Jerf el Ahmar. This room was destroyed by fire with all objects in place. All archaeological finds were associated with food processing. The room is approximately three by two meters and was attached to another room of the same size but which had no food processing tools. At the top right were found two stone platters which were polished on one side. To the left of these were three saddle querns. Charred remains associated with these querns consisted of the seed cake and fragmented grains of rye and some einkorn. At the bottom left were three stone basins probably used for holding water. Here the charred remains were predominantly barley. A burnt area in the back left corner was a shallow hearth. A small stone vessel together with a number of hand-held grinding stones were also found (photo from Willcox 2002, courtesy of Danielle Stordeur).

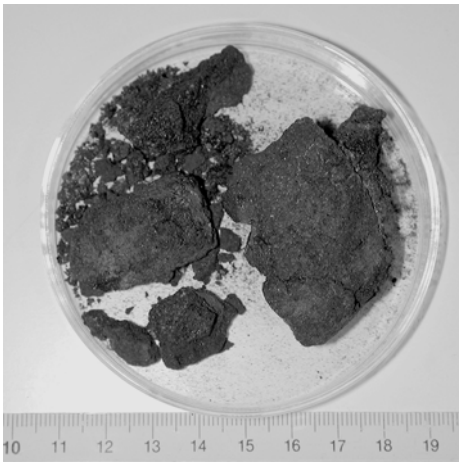

Fig. 3. The seed cake which was positioned on one of the querns. It consisted of compacted and crushed *Brassica* seeds.

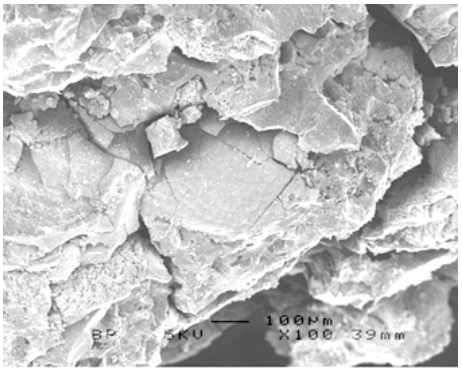

Fig. 4. Scanning electron microscope photo of the seed cake showing fragments of seed testa as seen in plan.

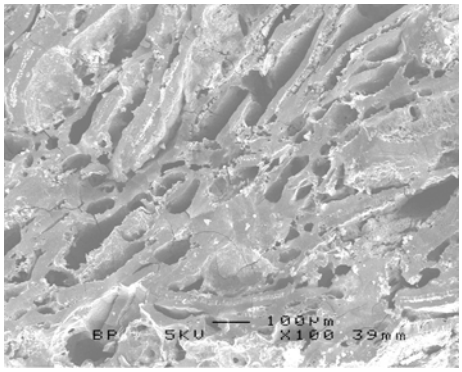

Fig. 5. Scanning electron microscope photo of the seed cake showing fragments of seed testa in section. This shows how compacted they were, perhaps to exact oil.

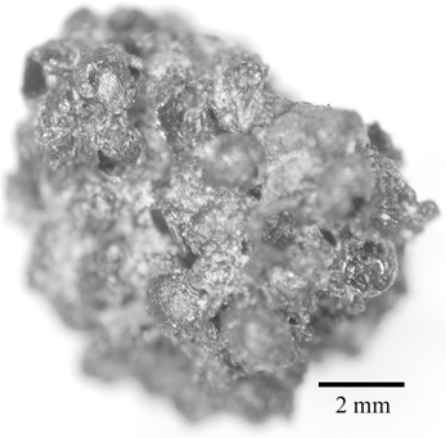

Fig. 6. Digital photo of a fragment of possible prepared food from Jerf el Ahmar (sample 544) consisting of a mass of small seeds. These seeds have not yet been identified.

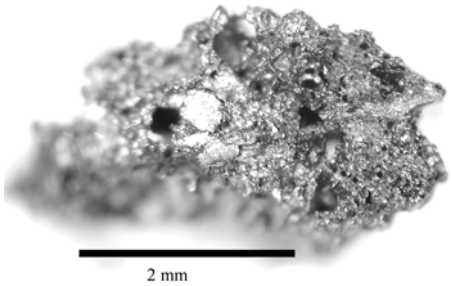

Fig. 7. Digital photo of a fragment of possible prepared food from Dja'de (sample 68) consisting of an amorphous matrix with some fibrous possibly "bran" inclusions. Finds of this kind are quite common at tenth millennium sites on the Euphrates but as yet have not been studied in detail.