UDK 903(3–11)"633/6342"
Documenta Praehistorica XXV (Poročilo o raziskovanju paleolitika, neolitika in eneolitika v Sloveniji XXV)

The socio-economic structure of Prehistoric communities in the Southern Levant, ca. 13000–8000 BP

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ABSTRACT – *The bearers of the Natufian Culture which probably descended from the Geometric Kebaran developed a complex hunting and foraging mode which allowed them to exploit relatively small seasonal habitats without having to move very long distances. It took well over two thousand years for this culture complex to develop further into the so-called PPNA where a more settled way of life with some emphasis on cultivation appeared in parts of the Levant.*

POVZETEK – *Nosilci kulture Natufian, ki verjetno izvira iz kulture geometrični Kebaran, so razvili kompleksen lovsko-nabiralniški način gospodarstva, zaradi česar so lahko izrabljali razmeroma majhna sezonska okolja, ne da bi morali prepotovati velike razdalje. V več kot dveh tisočletjih se je ta kulturni kompleks razvil v tako imenovani PPNA. Takrat se je v nekaterih delih Levanta pojavila stalnejša naselitev, določen pomen pa je dobilo tudi obdelovanje polj.*

The Levant, which extends from the southern flanks of the eastern Taurus in the north, down to the Sinai peninsula in the south, defines a territory ca. 1300 km long and 350 km wide. The Northern Levant includes the region encompassing the north-eastern Mediterranean littoral and the valleys of the Orontes, Middle Euphrates and Balikh in Syria. The region defined as the Southern Levant encompasses the territory crossed by the valleys of the Litani and Jordan, including the Mediterranean littoral extending from Lebanon to northern Sinai. Moreover, the Negev, the Sinai peninsula and Jordan are considered parts of this vast region.

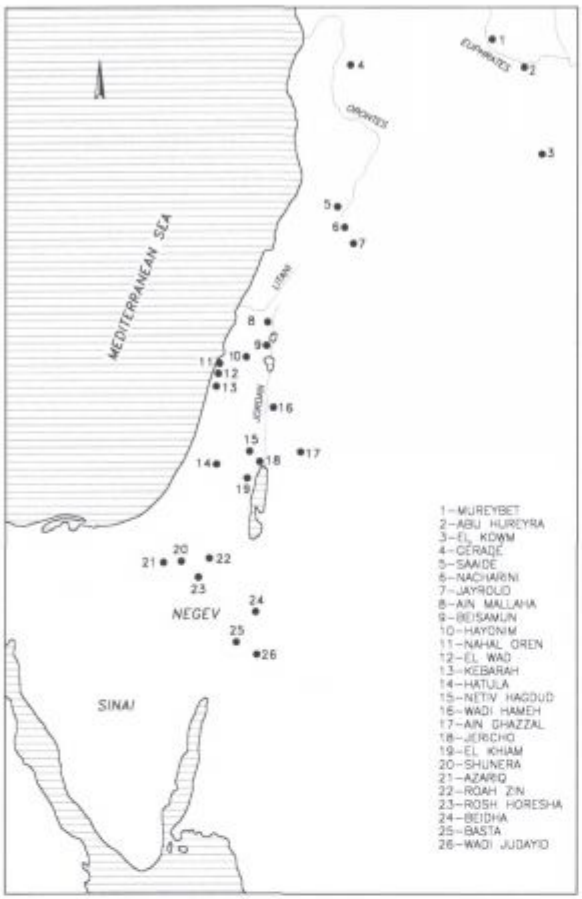
The material culture remains of Epipaleolithic and Pre-Pottery Neolithic communities of the Southern Levant are rather well documented, thanks to the large number of excavations[1].

The early phase of the Epipaleolithic in the Levant is, in a way, a continuation of the regional Upper Paleolithic lithic traditions. However, as far as subsistence base, site size and settlement pattern are concerned, these give the impression of being slightly more developed and complex than those maintained by the Upper Paleolithic groups. In the later phase of the Epipaleolithic in the Levant, hunter-gatherer communities, having adopted a more selective hunting strategy, started to consume more wild cereals in their diet. These economic adaptations would have no doubt required changes in settlement pattern, subsistence-related activities and, eventually, in the social structures of Late Epipaleolithic groups.

Although the various lithic assemblages produced by different Epipaleolithic groups in the Levant share a number of traits, they can nevertheless be differentiated by regional characteristics developed during the so-called industrial sub-phases. Among these assemblages, those produced by groups in northern and central Palestine, Lebanon and Syria show a wider distribution than those produced by groups centred in the Negev or Sinai (e.g. the Mushabian, the Negev Kebaran and the Harifian).

Generally speaking, the lithic assemblages of the Epipaleolithic groups in the Southern Levant reflect a subsistence economy in an environment rich in

1 It is important to emphasise that in the Levant, the term Epipaleolithic is used to include all the microlithic industries that postdate the Levantine Aurignacian C and predate the Pre-Pottery Neolithic (*Bar-Yosef 1975.363*).



The Distribution of Major Late Epipaleolithic and Pre-Pottery Neolithic Sites in the Levant.

fauna and flora. Palaeo-ecological records further confirm the existence of such a rich environment. Palaeo-ecological records of the Levant generally indicate that in the Late Pleistocene humidity rose considerably and, as a consequence of this, the Mediterranean woodlands expanded northwards, eastwards and southward, creating new habitats in upland areas with enriched flora (*Baruch and Bottema 1991; Bottema and Woldring 1984; Leroi-Gourhan et Francine Darmon; 1991; Rognon 1987; van Zeist et al. 1975*). This in turn allowed the hunter-gatherer bands to expand their subsistence exploitation areas well beyond the limits of their former habitats. Indeed, most of the Epipaleolithic sites in the Southern Levant are located in the Mediterranean woodland zone. A smaller number of sites, however, are located at the present steppe zone, which may have been slightly more humid and richer in vegetation at the time.

In terms of plant and animal domestication, as well as the emergence of communities living in permanent villages, the question often asked is whether or not the Neolithization process in the Southern Levant occurred slightly earlier than in the Northern Levant. Concerning the Southern Levant, archaeological records clearly demonstrate the close link between the Early and Late Epipaleolithic complexes in terms of basic economic exploitation modes and lithic industries. The best example of this is the Early Epipaleolithic Kebaran complex, which later developed into the Geometric Kebaran sometime before ca. 13000 BP

The Geometric Kebaran culture is the most widespread of the Levant's Late Epipaleolithic complexes. The artifactual variability of this complex reflects the adaptive responses of the Geometric Kebaran groups to different environments, which included not only the Mediterranean woodlands, but the arid zones of the interior as well[2].

By exploiting several, closely packed, but vertically differentiated resource zones, these communities were able to subsist within small territories. Consequently, this mode of economic exploitation reduced the extent of their cultural dispersion and prompted the emergence of relatively small enclaves.

Sometime after 13000 BP the Geometric Kebaran groups started to undergo an evolution in their socio-economic organisation. No doubt this was the result of the climatic changes mentioned above which expanded the Mediterranean woodlands and as a result created additional sources of food. This in turn encouraged sedentism. Like its contemporary, the Mushabian complex, in north-eastern Sinai, southern Negev and southern and eastern Jordan, the Geometric Kebaran Complex is dominated by chipped stone artefacts[3].

2 Group I, which is characterised by geometric microliths and backed bladelets, with the latter predominating, has a relatively wide distribution in the Southern Levant (*Kaufman 1987; Muheisen 1988*). Characteristic of Group II is a tool-kit dominated by backed bladelets and geometric microliths. Scrapers, burins, notches and denticulates appear in lower frequencies in the individual lithic assemblages as seen in the Central Negev sites. In the Group III microlithic assemblages triangles usually dominate, as long observed at Ein-Gev, Kfar Darom and Nahal Oren. The existence of marine shells in the inland sites suggests that contact was maintained between the coastal region and the hinterland groups. In Group IV the microlithic assemblages of Eastern Jordan and Judean Hill sites are dominated by lunates.

3 The tool-kit of the Mushabian complex is dominated by arched-backed bladelets, scalene bladelets, lunates, triangles and micro-burins (*Marks and Simmons 1977*).

In addition, the Geometric Kebaran assemblages sometimes include bone or stone tools and ornamental marine shells. The locations and composition of Geometric Kebaran sites indicate an annual cycle of transhumance into the uplands during the spring and summer months where water sources were more abundant. This was followed by a migration to lowland settings in the autumn and winter. The period spent in the uplands would have coincided with the period of new plant growth. During the spring-summer segment of the annual cycle the Geometric Kebaran communities would have dispersed into smaller and therefore more mobile groups. At the end of the summer, returning to their long-term base-camps, these groups would have re-created the larger social units they maintained in the autumn and winter. Such base-camps are identified mainly by the presence of plant processing tools like those found at the sites of Hefsibah, Neve David, and Ein Gev IV. Assemblages rich in plant processing tools indicate the presence of a subsistence economy with an emphasis on storable foods and therefore a more sedentary phase in the annual foraging cycle. This lowland transhumant segment of the Geometric Kebaran groups later developed into the more settled Natufians.

Unlike the Mushabian Complex, the origins of the Geometric Kebaran are, generally speaking, well understood. The latter grew out of the Kebaran and ultimately evolved into the Natufian within an interval of some 2000 to 2500 years. Although the Geometric Kebaran, with its temporally and spatially differentiated four industries, continued the basic economic, demographic and social patterns of the Kebaran, it differed from the preceding complex in its geographic distribution and material culture. The Geometric Kebaran was initially limited to the core Mediterranean zone, but with the improvement of climatic conditions some 14000 years ago it expanded into the interiors of Southern Levant, which constitutes the present steppe-desert zone.

In the Late Pleistocene of the Levant, two types of hunting-gathering strategies, based on simple and complex foraging seem to have existed. Simple foraging, which is defined as a risk minimizer, required a high group mobility which allows timely access to food resources. Complex foraging, on the other hand, could be regarded as a resource maximizer (*Gould 1982*). Its adoption would have allowed more permanency in settlement, since the hunter-gatherer groups using this strategy stored food plants and obtained certain food and other products through reciprocal exchange from other foraging groups.

The transition from simple to complex foraging within the Levant may be related to an increase in temperature that in turn caused an expansion of the Mediterranean woodlands into the uplands some 13 000 years ago (*Henry 1989.30*). This is a logical assumption, since the depressed Last Glacial temperatures would have confined cereals and other food resources associated with the Mediterranean woodlands to low elevations and warmer latitudes in the Levant (*Wright 1977*). For instance, wild barley, which is the most widespread of the Near Eastern cereal grasses, grows better on well-drained, deep loam, calcareous soils with a high nitrogen content (*Renfrew 1973.80–81*). Thriving under conditions of moderate rainfall, it does not tolerate extreme cold, and is confined to elevations below 1500 m, where the ripening season is relatively long and cool. As for wild emmer wheat, less arid-tolerant than barley, it thrives in areas receiving between 500–750 mm of rainfall annually (*Redman 1978.123*). It also grows in abundance on well-drained clay loam, calcareous soils and thus has a preference for basaltic and limestone regions. In the Levant, wild emmer has the more restricted primary habitat of the cereal grasses, for dense stands are restricted to the slopes and uplands of the Galilee and Golan Plateau overlooking the upper Jordan valley. Although the best areas for emmer are elevations below 900 m, with relatively high winter temperatures, elevations as high as 1600 m on the east face of Mt. Hermon support a slender, late-maturing variety *(Zohary 1969.49)*.

Complex foraging, involving the intensive collection of wild cereals and nuts, is particularly associated with the bearers of the Natufian culture[4].

The generally accepted view concerning the Natufian culture complex is that it emerged within the core Mediterranean zone between 12 800 to 12 500 years ago. Geographically, Natufian sites are found in the hill zone of Israel, Lebanon, and Jordan. The

4 The Natufian culture, which is the richest and best-known of the Epipaleolithic complexes of the Levant, was discovered by Dorothy Garrod 70 years ago during the excavation of the cave of Shukbah situated in Wadi Natuf. By the mid-thirties, additional cave-sites such as El Wad (*Garrod and Bate 1937*) and Kebara (*Turville-Petre 1932*) on the Mediterranean coast in the vicinity of Mt Carmel, and several sites in the Judean Hills south of Jerusalem (*Neuville 1934; 1951*) had been excavated.

contemporary sites in Syria, such as Mureybet (*Cauvin 1977; 1978; 1979*) and Abu Hureyra (*Moore et al. 1975*) fall outside the main cluster of the Natufian sites, although they share certain similarities in assemblages.

The Natufian chipped stone industry provides a great deal of information concerning the economic basis of this culture. The Natufian lithic assemblages are characterised by a microlithic technology that produced broad bladelets from multi-platform cores. In an average tool-kit, backed bladelets, burins, scrapers, and nothces-denticulates are evenly represented. Geometric microliths, with lunates accounting for between 60 to 98 percent of this category, dominate the microlithic assemblage. Sickle blades, generally accounting for less than 5% of a tool kit, are consistently present in Natufian assemblages, which also contain a diverse range of groundstone tools. Such tools further reflect the increased dependence of these communities on wild cereals and nuts. These include heavy stone bowls and pestles, bedrock mortars, and various other groundstone implements used for grinding and pounding.

In a sense, the Natufian horizon represents not only the earliest sedentary hunter-gatherer societies, but perhaps also the incipient phase of agriculture in the Southern Levant, at a time when a milder climate with a marked increase in annual precipitation replaced the conditions of the Late Glacial Maximum in the region. In the Natufian pattern of settlement, the hunter and gatherer communities showed a preference for higher elevation campsites mainly situated to the south and south-east of the lowlands. At a local scale, Natufian base camps, or hamlets shared several environmental and topographic features. They were located near the boundary separating level grassland settings (e.g. coastal plain, broad interior valley) from the wooded slopes of the Mediterranean hill zone. The strategic location of Natufian settlements allowed their inhabitants easy access to open habitats favoured by gazelle, and a forest habitat containing deer, cereals and nuts. Such settings also furnished a predictable water supply, along with sources of flint in the wadi gravels and limestone deposits.

This culture complex rapidly amalgamated several regionally distinctive Geometric Kebaran groups into a tightly bound culture. In the next 1500 years, population increases resulted in the colonisation of areas on the very margin of the Mediterranean zone. This acted to bring an expanding Natufian population into contact with simple foraging, late Mushabian groups in the Southern Levant and, very probably, similar groups elsewhere along the fringes of the Mediterranean woodlands.

In the Natufian culture the most important conceptual change concerns the relation between sedentism and foraging, as clearly demonstrated at Ain Mallaha, where the economy was based on the intensive collection of cereals and on hunting, but without the domestication of plants and animals.

Not all Natufian sites can be classified as base-camps consisting of habitation units, built-in installations for heating and food processing, and graves. In other words, Natufian sites with architectural remains and installations do not always reveal burials. A number of Natufian sites were probably only short-lived transit-camps. These usually reveal only lithic assemblages and animal bones. In fact, the larger base-camp sites are few and mainly located in the Mediterranean vegetation belt (*Valla 1975; 1981; Bar-Yosef 1981; 1982*).

The architectural characteristics of Natufian villages are best known from Ein Mallaha (*Perrot 1966; Valla 1981*), Hayonim Cave (*Bar-Yosef and Goren 1973*) and Rosh Zin (*Henry 1976*). Additional examples have been found at El Wad, Hayonim Terrace (*Henry and Leroi-Gourhan 1976*) and Wadi Hammeh 27 (*Edwards 1991*). In the Southern Levant, semi-subterranean circular and curvilinear structures, built with unmodified stones have been found, arranged either in a linear pattern or clustered.

Generally speaking, Natufian communities were larger and more permanent than their simple foraging predecessors or other contemporary groups. More than 200 skeletons recovered from El Wad, Kebara, Nahal Oren, Hayonim Cave, Ein Mallaha, Shukbah, and Erq el Ahmar (*Henry 1989.206*), provide the data-base on which some of the conclusions on Natufian society are based. The mortuary patterns indicate that Natufian society was stratified. During the Early Natufian, the dead were buried together in small groups[5]. The Early Natufian burials at El Wad reveal two distinct patterns of internment. In the cave area, a group burial contained skeletons of adults, children and infants in an extended position, accompanied by grave furniture, limestone blocks and hearths; but none were adorned with dentalium.

5 In the Late Natufian, the deads were buried individually in cemeteries.

On the terrace of the cave, five separate groups of burials contained skeletons of adults and children in a flexed position with one member of each group always wearing dentalium; but hearths and limestone were absent from these burials. The individuals wearing dentalium shells included men, women and children. The Early Natufian burials at Erq el Ahmar (*Neuville 1951; Vallois 1936*), Ein Mallaha (*Perrot 1966*) and Hayonim Cave (*Bar-Yosef and Goren 1973*) also show a similar mortuary practice, especially concerning highly decorated burials. It has been suggested (*Wright 1978*) that this may have involved a socially distinct subgroup of a Natufian community, perhaps to denote the transfer of high social status through inheritance. In the Late Natufian period, mortuary practices had changed to predominantly single interments. This shift, recorded at El Wad, is also seen at Shukbah (45 individual burials) and Nahal Oren (50 individual burials).

Long-range contacts within the Levant are evident during the Natufian period. Basalt objects are common in Natufian sites, far from the source of this material in eastern Galilee, dentalium shells were traded from the Mediterranean Sea inland and from the Red Sea northward.

Through their ability to store food surpluses in their permanent settlements Natufian groups took on the general appearance of early farming communities some two to three millennia before the first evidence of agriculture. However, since complex foraging resulted in intensive hunting and gathering, it would have eventually exhausted the food resources in a number of habitats[6].

The collapse of the Natufian complex and the dissolution of Natufian society in general can be attributed to population growth in the face of declining resources. In fact, at the peak of their expansion, Natufians began to experience a general deterioration in their habitat, especially along the southern and eastern margins. In conjunction with continued population growth, the dramatic reduction of the Mediterranean zone with its cereal and nut resources destabilised the Natufian adaptive system. As a consequence of this, Natufian settlements in the marginal areas were abandoned, their communities returning to a more mobile, simple foraging subsistence strategy. Only those living next to permanent water sources were able to continue a sedentary mode of existence by incorporating agriculture as an important part of their subsistence economy.

Complex foraging could not have lasted for a very long time mainly for climatic reasons. The renewed aridity in the region would have required a return to a less intensive mode of hunting and gathering. With the progressive deterioration of climate, Natufian communities on the margin of the Mediterranean woodlands were unable to sustain permanent settlements. Relying more and more on storable food, Natufian foragers lowered their resource ceilings in favour of the intensive exploitation of a more restricted range of food resources.

Although they maintained a less intensive foraging pattern and still depended heavily on the resources of what remained of the woodland habitat at the highest elevations, they were obliged to disperse their population into small, mobile groups during part of the year. Archaeologically, this transition is reflected by the Harifian industry, which is found in the arid zone of the Southern Levant. It shares strong techno-typological similarities with the Natufian to the extent that it is often included in the same cultural complex[7].

However, being geographically isolated, they were unable to maintain ties with contemporary Natufian communities to the north. Unlike the Natufian sites, Harifian sites are distributed in both lowland and upland settings in northern Sinai (*Bar-Yosef and Philips 1977*), the Negev (*Marks 1973; 1975; Marks and Scott 1976; Goring-Morris 1987*), and the southern Judean Hills (*Bar-Yosef, et al., 1974*). Although the type-site of Abu Salem, located on the Harif plateau of the Highland Negev and the nearby site E8, represent seasonal hamlets, the remainder of Harifian occurrences consist of small, ephemeral camps. The Harifian population would have been organised in small groups at lower elevations, and larger groups at the higher elevations, where they spent a longer time.

6 It has been suggested that the fact that Natufian culture lasted as long as it did, was mainly because the flora and fauna in the Southern Levant were not entirely depleted. This was perhaps due to the economic inefficiency of the exploitation methods of food resources (*Henry 1989.5*).

7 With a return to mobile foraging, the Harifians, emerging as a relatively short-lived complex (ca. 200 years) some 10 400 years ago, appear to have retained many aspects of the earlier Natufian tradition. Even the architecture of the Harifian complex shares similarities with the Natufian.

THE PRE-POTTERY NEOLITHIC HORIZON IN THE LEVANT

At the end of the Natufian horizon a new period known as the Pre Pottery Neolithic A (ca. 10 500–9300 BP), marks the emergence of small village communities of hunter-farmers in the Levant. These PPNA villages are found in a relatively narrow territory extending from the Damascus basin in the north to the Jordan valley and Transjordan in the south. Although agricultural activity may have intensified at a number of fertile habitats at this time, generally speaking, subsistence economies, especially in the arid parts of the Southern Levant, including the mountains of Lebanon, still relied largely on hunting and gathering. Fruits and wild seeds were intensively collected, and emmer wheat may have been cultivated on the plains. In the PPNA the lithic industry shows differences from the previous Natufian assemblages. The microliths decrease in quantity and burins become rather common. Sickle blades and bifacial tools appear in larger quantities, except in desert sites, where they are absent.

The PPNA in the Levant contains two distinct industries: the Khiamian and the Sultanian. The Khiamian industry, with its strong techno-typological ties to the Natufian, may be slightly earlier than Sultanian, although there is a good deal of overlapping between the two. The Natufian tradition survives in the lithic artefacts of the Khiamian industry, especially in its microlithic technology. This industry, with its characteristic points, is well represented in the lithic assemblages at Nahal Oren, Salibiya, Hatula and Mureybet Ib. The characteristic Khiamian lithic assemblages also include large tools such as picks and adzes, as well as ground stone artifacts such as mortars, bowls and querns. The Khiamian settlements, which measure between 1000 to 3000 m^2 in area, are usually found near water sources and in relatively low altitude areas. In most sites, architectural remains are rather poorly preserved, except for obvious cup marks. Faunal remains suggest a particular preference for gazelle. Generally speaking, the Khiamian groups continued the Natufian hunting tradition.

In contrast to the Khiamian lithic tradition, the Sultanian lithic industry lacks a strong microlithic character, having been based more upon blade production and bifacial tools. Large, heavy tools such as picks, adzes, tranchet axes form a substantial part of the Sultanian tool kits, along with sickles and burins, etc.. The presence of El Khiam points in low percentages at most Sultanian sites producing Helwan points (e.g. Mureybet) suggests ties between the bearers of these two lithic traditions.

In general, the lithic industry gives the impression of increasing specialisation. For the first time distant raw material in the form of obsidian coming from Anatolia indicates the extension of the reciprocal exchange mechanism to include distant lands. In the Sultanian assemblage, polished axes of limestone and basalt make their first appearance. Other ground stone items such as mortars and querns continue the earlier Natufian tradition.

Small semi-subterranean structures, round to oval in plan, characterise the domestic architecture at the Sultanian sites, as seen at Jericho PPNA, Nahal Oren Stratum II, Gilgal I, Netiv Hagdud in the Southern Levant and Mureybet II in the Northern Levant. These single room dwellings with plastered floors were usually furnished with hearths. The examples from Mureybet and Jericho suggest that such houses were sometimes internally divided.

Except for Nahal Oren, which was a small village or base-camp ca. 2000 m^2 in area, consisting of 15 semi-subterranean houses built in rows on a terraced slope, most Sultanian settlements are 1–3 hectares in size and therefore much larger than Khiamian sites. The Sultanian settlements too, like the Khiamian villages, were established at elevations not exceeding 300 m above sea level. Having said this, it is important to emphasise that both the Sultanian and Khiamian sites are located outside the natural habitats of wild cereals. In other words, wild cereals harvested during the summer in higher areas were carried and stored in the main village. It is quite probable that some Sultanian communities attempted to plant the wild cereal seeds near their settlements. This could perhaps explain the presence of cultivated cereals at some of the PPNA sites in the Levant. At Jericho, for instance, the remains of domesticated emmer wheat (*Triticum dicoccum*) and hulled two-row barley (*Hordeum distichon*) were found in the Sultanian levels (ca. 10 000 BP).

Further north also at Mureybet II, the source of the wild cereals such as einkorn and barley consumed by the PPNA inhabitants was in the uplands some 100–150 km north-west of the site[8].

8 At Mureybet there is an uninterrupted sequence extending from Final Natufian (IA), through Khiamian(IB-II) and Sultanian (III). See *van Loon 1968; Cauvin 1977; 1978.*

In Level IIIA the village of Mureybet expanded considerably, becoming a settlement of up to 3 hectares in area. In Level IIIB the construction of silos suggests that the cereals, although mostly wild, became rather important in the diet of the population.

It is the PPNA village at Tell Aswad, situated between lakes of Hijjane and Ateibe in the Damascus basin which produced the earliest domesticated emmer wheat in Syria. Although the current levels of precipitation in this region, which is less than 200 mm a year, is not sufficient for the dry farming of wheat, in the Early Holocene, conditions may have been more humid. In the earliest occupation (Phase IA: 9800–9600 BP), the village consisted of semi-subterranean round houses, ca. 3 m in diameter. The El Khiam type arrowheads may indicate that a people of Khiamian tradition introduced the stage of incipient cultivation, perhaps from further south (*de Contenson 1972; 1976; 1983*). This village revealed in addition to domesticated emmer, wild barley, which grew some 50 km away from the settlement, peas (*pisum sativum*) and lentils (*lens culinaris*).

Although most evidence for domesticated cereals comes from the Northern Levant, the emmer sample from PPNA Jericho, presumed to be the earliest so far recovered, has long been used as evidence that the cultivation of wild cereals started in the Southern Levant earlier than in the north. While this hypothesis accords well with the assessment that arid conditions in the Levant started earlier in the south than in the north, and therefore, the inhabitants of the south, experiencing difficulties in maintaining their former exploitation levels, cultivated cereals, it raises some questions. Indeed, if arid conditions prevented the regeneration of wild strains of cereals in their natural habitats, then the same insufficient levels of precipitation would have made the cultivation of wild wheat locally quite difficult.

In the following, PPNB period (ca. 9300–7800/7500 BP) climatic conditions continued to be favourable for agriculture. Although most sites remained relatively small, some developed into large settlements of over 10–12 hectares in area. Among the large sites are Abu-Hureira in Syria, Çayönü in south-eastern Turkey, Ain Ghazal, Beisamun and Basta in Jordan. The village economy at this time was based on the cultivation of domesticated species of cereals and legumes, and the collection of wild seeds and fruits. The hunting of gazelle, roe deer, fallow deer, wild boar and hare was supplemented by raising goats and sheep. In this period, bifacial tools such as axe/adzes and celts saw some changes through time. Rounded retouches and polished working edges are among the characteristic features at this time. In the PPNB, burials are found under floors and open spaces. The skulls of adults were removed and sometimes plastered. In a few sites, skulls were stored in special places and buildings.

The collapse of the PPNB in the Southern Levant manifested either as a major break in cultural continuity or abrupt changes in the settlement pattern, may have been due to the deterioration of environmental conditions. At the site of 'Ain Ghazal, near Amman, this phase is known as PPNC. A community involved in goat husbandry and agriculture established this village in ca. 9250 BP, during the PPNB period. The villagers seem to have supplemented their subsistence requirements by hunting and foraging (*Rollefson 1989*).

Some ten generations after its foundation Ain Ghazal more than doubled its 2 hectares of habitation area. By 8250 BP, or thirty generations later, towards the end of the PPNB, the village had become approximately 10 hectares in area. This constant expansion of the community no doubt adversely affected the natural vegetation cover surrounding the settlement. At that time an average house at Ain Ghazal with plastered floors and walls was 50 m^2. The construction of such a house required, among other materials, a large quantity of burnt lime. Since the plastered floors were ca. 6.6 cm thick, and walls and ceilings were plastered with ca. 3 mm of lime, each house would have required 3.3 tons of plaster. This quantity of plaster could have only been obtained by burning at least six average-size oak trees. Considering that additional 4 oak trees would have been used for the construction of each house (*Edlin 1976*), the damage to the tree cover near the village becomes obvious. Although the scarcity of wood at this time may have been a local phenomenon, it could have been one of the reasons for the change to a local architecture now characterised by houses with small, cell-like rooms.

In the following 500 years during the PPNC, the village grew further, reaching more than 12 hectares in area. After 7750 BP the village was finally abandoned. It was resettled several centuries later by nomadic pastoralists of the Yarmoukian phase of the Pottery Neolithic period.

The faunal and botanical data from 'Ain Ghazal is particularly illuminating concerning the subsistence

economy of the PPNB and PPNC inhabitants. Domestic goat, gazelle, wild cattle, pig, hare, fox, turtle were consumed in that order of preference.

As for food plants, which provided up to 50% of the daily food consumption, these consisted of field peas, lentils, emmer, einkorn, bread wheat, domestic, two-row hulled barley, chickpeas, pistachio, figs and vetch. Therefore, assuming that an 'Ain Ghazal adult required 2500 calories per day, half of this being obtained from food plants, at least 125 kg of grain and legumes per person had to be produced by this community annually (*Rollefson and Kohler-Rollefson 1989.75*).

Considering that half an acre of land could have produced 125 kg of food plants, then the community of Ain Ghazal would have cultivated/harvested a considerable amount of land.

Once agriculture was given prominence in local economies, it would not have been very long before soils, at least within the 3–4 km radius of farming villages, became exhausted, especially if on sloping terrain which is prone to erosion. In such terrain, after 500 years of constant cultivation, the fertility of the soil declines considerably (*Hole et al. 1969. 346–347, 350*). Moreover, the close browsing habits of goats grazed on arable lands would have removed the protective vegetation cover before the onset of the rains.

In the PPNC the inhabitants of 'Ain Ghazal depended more on domesticated species, which included sheep, cattle and pig. However, becoming more sedentary than before did not prevent this PPNC community from organising long-term hunting expeditions to obtain fresh meat, skins, and furs. The rarity of grinding stones during the PPNC suggests less emphasis was placed on agriculture at that time.

DISCUSSION

The assumption that the bearers of the Natufian culture comprised the first sedentary hunter-gatherer society in the Levant is solely based on cultural attributes, such as the existence of large base camps with stone architecture and food processing installations, and the communal burial grounds located near some of them. Moreover, the diverse methods of adorning and burying the dead could indicate that the Natufians were a ranked society. The Natufian communities, by pursuing a year-round exploitation of the local fauna and avifauna, placed more emphasis on selective hunting to ensure the long-term viability of their subsistence strategy. In fact, the highly selective culling of male wild gazelle was a step short of the actual domestication of animals such as wild sheep and goat (*Cope 1991; Tchernov 1991*). The domestication of the dog (*Davis and Valla 1978*) is also a strong indication that the Natufians brought about an economic change during the last phase of the Levantine Epipaleolithic period. The intensive exploitation of plants is reflected in an abundance of harvesting and food-processing tools and storage facilities (*Wright 1991; Bar-Yosef and Belfer-Cohen 1989; Garrod 1957; Valla 1981*). The increasing reliance on wild food plants at this time is further corroborated by dental studies of human skeletal remains (*Smith 1991*). According to macrobotanical studies carried out on plant remains, it seems that the Natufian hunter-gatherers consumed mainly the seeds, nuts, and fruits of Mediterranean trees (*Lev-Yadun and Weinstein-Evron 1994.391; Hillman et al., 1989; Garrard et al., 1988; Edwards 1989*). However, despite the intensification in the exploitation of food plants, the domestication of cereals did not begin before the Pre-Pottery Neolithic period. The question is, however, when and where were wild cereals first domesticated? This question is particularly important, given that the wild relative of domesticated einkorn wheat (*Triticum m. monococcum*) is the wild einkorn wheat (*Triticum monococcum subsp. boeticum*), whose primary habitats are said to occur in the northern and eastern parts of the Fertile Crescent (*Heun et al., 1997*). The fact that domesticated einkorn found at Abu Hureyra is dated earlier than the southeast Anatolian samples found at Pre-Pottery Neolithic settlements closer to the primary habitat of wild emmer in Karacadağ could perhaps indicate that, in the Late Pleistocene, stands of *Triticum m. boeoticum* may have temporarily existed further south in northern Syria (*Hillman 1996*). Although, the Karacadağ mountains are now considered the likely location of einkorn domestication, it is pointed out that the "localisation of the precise domestication site of one primary crop does not necessarily imply that the human population living there at the end of the Paleolithic played a role in establishing agriculture in the Near East. Nevertheless, it has been hypothesised that one single human group may have domesticated all primary crops in the region" (*Heun et al., 1997.1313*). In view of this new DNA fingerprinting study concerning the site location of einkorn wheat domestication in the Near East, the assumption that the domestication of food plants started in the

Southern Levant should be reconsidered by weighing the possibility that some of the cultivated einkorn wheat consumed by the PPNA population of Southern Levant (e.g. Jericho) was obtained from more distant sources in the north. This in turn could suggest that the PPNA communities in the Levant in general and in the Southern Levant in particular were socio-economically more developed than previously envisaged. In other words, through their reciprocal exchange mechanism these communities were able to obtain not only prestige goods and raw materials such as obsidian for certain artifacts but also certain food staples which later on they cultivated themselves. What is almost certain, however, is that the seeds for such a complex society with a well-organised, subsistence economy were sown in the Natufian period.

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