Tell el-Kerkh as a Neolithic Mega Site

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The Levant has been a focus of attention for those studying the ultra-large (mega) Neolithic sites that appeared and developed during the Late PPNB period. However, some scholars are skeptical about the size of mega sites, believing that they merely appear to be large because of a sequential accumulation of smaller settlements and assert that there was no qualitative difference between mega sites and small settlements. Did the sites merely appear to be large, or were they truly so? The answer will condition the way we approach the past and our understanding of the development of complex societies.

In this paper, I shall discuss the evidence for the Neolithic settlement patterns and settlement sizes in the Rouj Basin, northern Levant, where we have been working for twenty years. My focus is the site named Tell el-Kerkh, a Neolithic mega site in the Rouj Basin. After detailed investigation of the excavation results and surface collections, I reconstructed the settlement sizes and patterns of the Neolithic periods. At Tell el-Kerkh, the Neolithic settlement expanded to around 16 ha during the Late PPNB period; then reduced gradually to 8 ha, 6 ha, and finally to smaller than 1 ha during the Pottery Neolithic periods. The thickness of cultural layers during the LPPNB period indicates that most areas were occupied simultaneously and continuously and that the Late PPNB settlement at Tell el-Kerkh was not merely large but truly large, perhaps also indicating some levels of social complexity. Therefore, we may accurately call it a mega site.

**Keywords:** Tell el-Kerkh, Late PPNB, Neolithic mega site, The Rouj Basin, Social complexity

I. Introduction

The Levant has been one of the focuses for the study of Neolithization and the development of complex societies in human history. The Late Pre-Pottery Neolithic B (PPNB) period (from 7600 to 7000 cal BC) is considered a significant turning point, as many scholars have noted the emergence of ultra-large settlements (mega sites) during this period. Notable examples include 'Ain...
Ghazal (Rollefson 1987; Rollefson and Simmons 1988), Basta (Gebel, Muheisen, and Nissen 1988; Nissen, Muheisen, and Gebel 1991), Wadi Shu’eib (Zeuner 1957), and Beisamoun (Lechevallier 1978) in the southern Levant and Tell Abu Hureyra (Moore et al., eds. 2000), Tell Halula (Molist 1996), and Tell el-Kerkh (Tsuneki et al. 1997, 1998, 1999, 2000) in the northern Levant. There are also examples of mega sites in central Anatolia, such as Aşkılı Höyük (Esin and Harmankaya, 1999) and Çatalhöyük (Hodder 1996, 2007). Curiously, however, the regions east of the Euphrates lack any evidence of Neolithic mega sites. Therefore, the Levant has been the most significant region in considering the emergence of mega sites in West Asia.

These mega sites sometimes exceed 10 ha, making them comparable to the small cities of later periods. However, issues concerning their characteristics have been controversial. Some scholars call them “regional centers” and regard them as centers for the development and diffusion of new concepts and techniques (e.g., Rollefson 1987). Other scholars are skeptical about the size of these settlements and believe that they merely appear to be large because of a sequential accumulation of smaller settlements (e.g., Hole 2000). They suggest that there was no qualitative difference between large and small settlements. In order to understand these mega sites, it is essential to investigate the nature of their social, economic, and religious complexities and their contemporary settlement sizes. Were they large merely in appearance, or were they truly large? The answer will condition the way we approach the past and our understanding of the development of complex societies.

In this paper, I shall discuss evidence for settlement patterns and sizes in the Rouj Basin, where we have been working since 1990. I will focus on a site named Tell el-Kerkh, a Neolithic mega site in the northern Levant that we have been excavating since 1997. Using evidence from this site, I would like to explore the nature of mega sites of the Late PPNB period.

II. The Rouj Basin and its Local Chronology

First, I would like to describe the Rouj Basin, where Tell el-Kerkh is located, and its local chronology. The Rouj Basin, located 10 km west of modern Idlib city (in northwestern Syria), is a small graben surrounded by limestone mountains. It extends north to south by about 37 km and east to west by between 2 and 7 km (Figs. 1 and 2). An archaeological mission from the University of Tsukuba conducted the first intensive general survey in this basin from 1990 to 1992, including test pits at Tell Aray 1 and 2, Tell Abd el-Aziz, and Tell el-Kerkh 2 (Iwasaki and Nishino 1990, 1991, 1992; Iwasaki, Nishino, and Tsuneki 1996).
Afterwards, we continued the archaeological study of the basin (e.g., Iwasaki and Tsuneki 2003; Tsuneki and Hydar 2007; Tsuneki et al. 2011).

Based on these studies, we established the local Rouj Basin chronology. The Neolithic part of the Rouj Basin chronology is briefly summarized below (see Table 1, Figs. 3 and 4).

Rouj 1 corresponds to the Pre-Pottery Neolithic B in the broad Levantine chronology. No PPNA site was discovered during our research in the Rouj Basin. The Early PPNB layers recovered at Tell Ain el-Kerkh represent the earliest Neolithic evidence found in the Rouj Basin. The Rouj 1 era can be divided into two periods, Rouj 1a and 1c. As there must have been a hiatus between these two periods contemporary with the Middle PPNB period, we created the term Rouj 1b to indicate this period.
Fig. 2  Distribution of Tells in the Rouj Basin.
Fig. 3  Lithic Chronology of the Rouj Basin during the Neolithic Periods
Fig. 4  Pottery Chronology of the Rouj Basin during the Neolithic Periods
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Table 1 Rouj Basin Chronology

<table>
<thead>
<tr>
<th>Rouj Basin Chronology</th>
<th>Supposed years based on $^{14}$C dating (cal.)</th>
<th>Levantine Chronology</th>
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<tbody>
<tr>
<td>Rouj 2d</td>
<td>6100 - 5800 BC</td>
<td>Late PN</td>
</tr>
<tr>
<td>Rouj 2c</td>
<td>6600 - 6100 BC</td>
<td>Middle PN</td>
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<tr>
<td>Rouj 2a-2b</td>
<td>7000 - 6600 BC</td>
<td>Early PN</td>
</tr>
<tr>
<td>Rouj 1c</td>
<td>7600 - 7000 BC</td>
<td>Late PPNB</td>
</tr>
<tr>
<td>Rouj 1a</td>
<td>8700 - 8300 BC</td>
<td>Early PPNB</td>
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Rouj 1a (EPPNB): The lowest layers of the northwest area at Tell Ain el-Kerkh provide the indicator for this period. $^{14}$C dating suggests that this area dates from c. 8700 to 8300 cal BC. Sophisticated Naviform cores were used in blade production, and the stone tools were primarily made from the blades. The most characteristic tool-types are Aswad points and large blades with fine retouch on one lateral edge. Pressure flaking was frequently used to retouch the point.

Rouj 1c (LPPNB): This period corresponds to the Late PPNB period. $^{14}$C dating suggests that this period dates from c. 7700 to 7000 cal BC. The stone cores for blade production consisted of Naviform cores and single platform cores. The Byblos point had become the main point type, with the Ugarit point also frequently appearing in the assemblage. Large sickle blades truncated at both ends, ordinary blades, and end scrapers on flakes were the main tool types.

Rouj 2 corresponds to the Pottery Neolithic (PN). This era can be divided into four periods.

Rouj 2a (Incipient PN): Layers 6–5 in the Test Pit (hereafter TP) of Tell el-Kerkh 2, which produced the earliest type of pottery in the Levant, provides a typical assemblage for this period. The main chipped stone tool types are the Ugarit point, Amuq point, large sickle blades truncated at both ends, and end scrapers on blades and flakes; the technical continuity from Rouj 1c is remarkable. The most notable indicator for this period is the presence of so-called “Kerkh Ware,” the prototype of Dark-faced Burnished Ware (DFBW) (Tsuneki and Miyake 1996; Miyake 2003). In layers 6–5 of Tell el-Kerkh 2, Kerkh Ware accounted for 33–42% of the pottery assemblage. However, we have not yet discovered a pure Kerkh Ware cultural layer in the excavations at Tell el-Kerkh. Kerkh Ware potsherds have always been discovered with early DFBW.

Rouj 2b (Early PN): We discovered the layers of this period in various trenches at Tell Ain el-Kerkh, Tell el-Kerkh 2, and Tell Aray 2. $^{14}$C dating
indicates that Rouj 2a-b dates from between c. 7000 and 6600 cal BC. The chipped stone tools are similar to those of Rouj 2a. Kerkh Ware dwindled and finally disappeared, and the DFBW became the main pottery, with some accompanying Coarse Ware potsherds. The DFBW is a fine ware with grit-tempering. In addition to the bowl, the jar became a significant pottery form. Applique bands and ridge handles were sometimes added to the outer surface of the pottery. Nail and pinch impressions are the most characteristic decorations for DFBW of this period. White-plastering, with occasional reddish painting, is also a characteristic decoration for this pottery.

Rouj 2c (Middle PN): Layers 6–4 of the Central Area, the main excavated squares of Tell Ain el-Kerkh, provide the most typical objects for this period. $^{14}$C dating of many of the organic samples indicates that this period spans between c. 6600 and 6100 cal BC. For the chipped stone tools, the Amuq point with pressure flaking retouch had become the main point type. Most sickle elements were truncated at both ends and of relatively short lengths. Small drills on blades for boring beads had become one of the main chipped stone tools. The number of scrapers on flakes diminished less than in the previous period. DFBW and Coarse Ware were the main pottery types. The varieties of DFBW became richer and included carinated bowls, S-shaped bowls, hemispherical bowls, deep bowls, shallow bowls, short-necked jars, collar-necked jars, hole-mouthed jars, and stands. Low applique bands were frequently applied to the upper part of the outer surface of the pottery. In addition, fine stick impressions were observed as a decoration. Large and flat-based bowls and jars were the main forms of chaff-tempered Coarse Ware, which were mostly plain and rarely decorated. The husking tray is one of the most characteristic of Coarse Ware varieties.

Rouj 2d (Late PN): The last phase of the Pottery Neolithic dates from c. 6100 to 5800 cal BC. With few diagnostic imported potsherds, this period can be compared to the beginning of the Halaf period in Jazirah. This period was represented mainly by the materials from layers 3-1 of the Central Area at Tell Ain el-Kerkh. The chipped stone tools suddenly lost their definite forms and consisted mainly of rough flake tools. Although the point-type tool disappeared, a few very sophisticated stone daggers made with pressure flaking retouches were discovered. Crescent-shaped sickle elements and tile knives were also characteristic stone tools of this period. In addition to DFBW and Coarse Ware pottery, Dark-faced Unburnished Ware and Cream Ware (Red Washed Ware) appeared in this period. A few fine painted potteries, including early Halaf painted potsherds, were also discovered. Remarkable forms, such as the flat-based bowl with a flared rim, the cream bowl, and the short-necked jar, all of
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which were typical of Early Halaf painted pottery, flourished among Rouj 2d DFBW. Sophisticated pattern burnishing is a characteristic decoration of fine DFBW.

Following this Rouj local chronology, we will now discuss the settlement patterns of the Rouj Basin during the Neolithic period, after which the size of Tell el-Kerkh will be examined.

III. Neolithic Settlement Patterns in the Rouj Basin

In the Rouj Basin, thirty-seven tell-type settlements have been registered (Fig.2). Surface collection indicates that most tell-type settlements were occupied throughout several periods and that they date from the Early PPNB to the Islamic Ages. The results of our systematic general survey told us that the basin was prosperous in the late PPNB, Pottery Neolithic, Early Bronze Age (EB), Middle Bronze Age (MB), Iron Age, and Roman-Byzantine periods. As the focus of this paper is on the Neolithic era, I will discuss the settlement patterns during the Rouj 1 and 2 periods only. Although it is occasionally difficult to place the collected objects into specific periods, I will try to date each site as accurately as I can.

As mentioned above, the Rouj 1 and 2 periods were prosperous in the Rouj Basin. Twenty-two of thirty-seven tell-type settlements produced materials dating from this era. I will introduce each site (Fig.5).

**RB002 Tell Douf** (also called Tell Bir al-Taib): Tell Douf is located in the middle of the northeastern branch valley. The northern and eastern edges of the tell were cut into agricultural fields, and its original shape has been drastically changed. Nevertheless, the mound seems to have been an elongated oval with a longer axis in the north-south direction. It now measures about 300 m from north to south and 200 m from east to west. Its height relative to the surrounding plain is 16 m, and the slopes are relatively gentle (Fig.5-1). The most numerous materials on the tell surface come from the Iron Age and Roman-Byzantine periods. Painted and smeared wash potsherds from the EB and MB were also present. It is notable that a few DFBW sherds, stone axes, flint and obsidian chipped stones, spindle whorls and pottery discs, all belonging to the Neolithic (probably Rouj 2b and 2c) periods, were collected, especially on the gentle southern slope. Therefore, the size of the Neolithic settlement of Tell Douf that existed in the southern part of the tell was less than one-quarter of its total size, around 1ha.

**RB003 Tell Betraad:** This tell is located in the middle of the northeastern branch valley, about 2 km southwest of Tell Douf. The mound has been cut and
1. Tell Douf (RB002)
2. Tell Betraad (RB003)
3. Tell Failoun 1 and 2 (RB006)
4. Tell Aray 1 & 2 (RB007,008)
5. Tell Abd el-Aziz (RB010)
6. Tell el-Kerkh (RB015-1017)
7. Tell Tlaylat (RB018)
8. Tell Marwan 2 (RB020)
9. Tell Hadad (RB022)
10. Tell Milis (RB024)
11. Tell Galyoun (RB025)
12. Tell el-Ghafar 1 (RB026)
damaged by bulldozers. The present plan is somewhat rectangular, but it originally seems to have been an oval with a longer axis in the north-south direction. It measures about 200 m from north to south and 160 m from east to west. Its height above the surrounding plain is 15 m (Fig. 5-2). The slopes of the mound are relatively gentle. Although potsherds of various periods are distributed on the mound, those from the Iron Age and Roman-Byzantine periods are the most numerous. A small number of potsherds belonging to the Early and Middle Bronze Ages were present. There are also a few PN (probably Rouj 2b-c) potsherds. Therefore, the Neolithic settlement here was smaller than 2 ha.

**RB006 Tell Failoun 2:** Tell Failoun 2 is one of two tells located in the northeastern part of the basin, about 500 m away from the foot of the eastern mountains and 500 m west of El-Kraiz village. The mound has a long oval plan with a longer axis in the north-south direction. It measures 220 m from north to south and 100 m from east to west (Fig. 5-3). The cultural deposits seem to have been only 1 m thick, accumulated on the edge of the narrow natural limestone hill stretching in a NNE-SSW direction. Neolithic sherds (probably of the Rouj 2c variety), lithic stones, and Roman-Byzantine materials were present on the surface. This Neolithic settlement was 1.5 ha at most.

**RB007-008-009 Tell Aray:** This was the Rouj Basin’s second largest tell complex after that of Tell el-Kerkh during the Neolithic era. Tell Aray consists of three adjoining tells, Tell Aray 1, 2, and 3 aligned south to north (Fig. 5-4). It
is located west of Aray village, at the foot of the eastern mountains, in the northeastern part of the Rouj Basin. The total length from the southern edge of Tell Aray 1 to the northern edge of Tell Aray 3 is c. 700 m, and the widest part of the tell complex from east to west is c. 250 m. As we can collect Rouj 1c and Rouj 2 materials from the surface of Tell Aray 2 and 3, these two tells were occupied mainly during these periods. Although the main occupational era of Tell Aray 1 comprises the EB and MB periods, Rouj 2 materials are also collectable from the surface. The test excavations at Tell Aray 1 and 2 produced a good cultural sequence from the Rouj 2b to the Rouj 3a periods. The former shows us the sequence from the Rouj 2c to the Rouj 3a and the latter from the Rouj 2b to the Rouj 2d period. At Tell Aray 2, we stopped the test excavation at the Rouj 2b layers, and thick cultural deposits remain unexcavated below them. Therefore, the earlier Neolithic layers, especially the Rouj 1c layers, must have been accumulated there. Based on these test excavations and surface collection, we suppose that the extent of the Rouj 1c settlements was between 5 and 10 ha and that of the Rouj 2 periods, less than 5 ha.

**RB010 Tell Abd el-Aziz:** This is a small tell, measuring c. 120 m by 100 m and 3 m high, located 3 km south of Tell Aray (Fig.5-5). The surface collections indicate that this tell has cultural layers spanning from the Neolithic to the Chalcolithic eras. We excavated a 5 m by 5 m test pit on the tell top that produced a cultural sequence from the Rouj 2d to the Rouj 3b (Ubaid) periods. Therefore, we may conclude that a 1 ha settlement was continuously occupied from the Rouj 2d to the Rouj 3b period.

**RB015-017 Tell el-Kerkh:** Consisting of three contiguous tells, this is the largest tell complex in the Rouj Basin and is located in the southern part of the basin (Fig.5-6). A large settlement, measuring c.16 ha, was present here during the Rouj 1c period, details of which will be discussed later.

**RB018 Tlaylat:** This is a small artificial mound discovered on a natural hilltop in the southern part of the Rouj Basin. As exposed limestone is present on its northern slope and basalt on its southern slope, it is supposed that basalt lava covered the limestone bed from the south. The area of material distribution measures only 40 m by 40 m, and the thickness of the cultural deposits is only 2 m (Fig. 5-7). Neolithic flint chipped stones and potsherds are the most numerous objects recovered from the surface of Tlaylat. Some ground stones, such as stone axes, were also present. Amuq-type points, blade elements, and other tools are conspicuous among the chipped stones. Most of the DFBW sherds are plain and undecorated. Bowls with a short-everted rim are numerous. The Coarse Ware sherds have a cream surface and are heavily chaff tempered. These
characteristics indicate that these potsherds are of the Rouj 2c variety. Some ground stones, such as stone axes, were also retrieved. Besides Neolithic objects, some later potsherds, probably from the Middle Bronze Age, were observed. However, these are few. Therefore, we can suppose that the hilltop of Tlaylat was briefly occupied by Neolithic people. It is still uncertain whether they built a small settlement there or used it as a temporary habitation for some special purpose.

**RB020 Tell Marwan 2:** Two tells are located in the southeastern corner of the Rouj Basin. One is Tell Marwan 2, just southwest of another artificial mound (Tell Marwan 1) beyond a small wadi (Fig.5-8). Tell Marwan 2 was formed on the narrow hill with a basalt lava basement, stretching in the NNE-SSW direction. Artifacts were recovered from an area measuring 200 m by 120 m. It must be called an open site rather than a tell-type settlement because its cultural layer seems to be very thin. Although Roman-Byzantine and Islamic potsherds are sparsely distributed throughout the site area, the most conspicuous materials from the surface are chipped flints and Neolithic potsherds. Flints include various types of cores and tools, such as scrapers, sickle elements, and points. Most of the chipped flints seem to belong to the Rouj 2c and 2d varieties from the typological viewpoint, because Amuq-type points, crescent-shaped sickle elements, and single-platform cores are included among the surface collections. The very few collectable characteristic potsherds probably belong to the Rouj 2b and 2c varieties. Tell Marwan 2 was probably used as a temporary site, such as for a flint workshop, during the Rouj 2b to 2d periods.

**RB022 Tell Hadad:** There are four tells in the northwestern branch valley of the Rouj Basin, and Tell Hadad is located at the bottom. It was the largest mound among the four tells and measures 280 m from north to south and 200 m from east to west. Its plan is roughly oval, and the southern slope is gentler than the others (Fig.5-9). There is a small aggregation in the northern part of the top of the mound, and its height above the surrounding plain to the highest point is 23 m. A large number of Iron Age potsherds were present on the mound surface. Byzantine and Islamic potsherds are also distributed, especially on the top. On the slopes of the mound, Early and Middle Bronze Age potsherds were scattered among the Iron Age materials. A few DFBW potsherds were present on the southern and eastern slopes. There are some flint sickle elements of the Rouj 2 varieties. Occupation before and after the Rouj 2c period definitely occurred at Tell Hadad. The Neolithic settlement size might be much smaller than what it appears to be.

**RB024 Tell Milis:** This is located in the middle of the northwestern branch
Tell Milis is situated at the southern end of a small north to south ranging limestone hill. The tell has a clear oval plan, measuring 280 m from east to west and 190 m from north to south (Fig.5-10). The height above the surrounding field is 20 m, and the tell’s summit is visible from its eastern part. Potsherds from the Iron Age and later periods are numerous on the tell top. However, many Early and Middle Bronze Age potsherds were collected from the slopes. Some fine heavily burnished potsherds, apparently of the Rouj 2c or 2d varieties, provide the sole evidence of Pottery Neolithic occupation there.

**RB025 Tell Galyoun:** This is located at the mouth of the northwestern branch valley of the basin. The tell has a roughly circular plan, measuring 160 m from north to south and 180 m from east to west. It has a relatively gentle slope. The height above the surrounding plain is c.10 m (Fig.5-11). Iron Age and Roman-Byzantine potsherds are obtainable from the top and upper parts of the tell slope, while some Neolithic and Chalcolithic potsherds were present on the lower slope and the foot. In particular, the eastern foot produced many Neolithic potsherds. This prehistoric pottery includes DFBW, Coarse Ware, Cream Ware, and fine painted ware. Most of the DFBW are plain, without surface decoration. The Coarse Ware has heavy chaff and lime-grit inclusions and probably belongs to the Rouj 2c variety. The fine painted ware has black or red paint on light colored surfaces and seems to be of the Rouj 2d or Rouj 3 variety with Red Washed Ware (Cream Ware). Besides these prehistoric potsherds, chipped flints, obsidians, and ground stone tools (such as axes, chisels, and hammer-stones) are also present on the surface of the tell. Some chisels were made of serpentinite; these stone implements seem to belong to the Neolithic variety. Therefore, Tell Galyoun was occupied by the Rouj 2c people, and their occupation continued until the next period. The site was reoccupied during the Iron Age and later periods.

**RB026 Tell el-Ghafar 1:** Tell el-Ghafar 1 is situated in the northwestern end of the main Rouj Basin, at the foot of the eastern limestone mountain. The tell is a low mound, and its height relative to the surrounding field is about 4 m (Fig.5-12). The mounds were damaged by agriculture and a road. The area where flints and Neolithic potsherds are present covers about 140 m by 140 m. The Neolithic people situated their village on a gentle slope near the mountain foot. Neolithic flints and potsherds are densely distributed around a local house near the tell top. Similar objects can be collected on the eastern and northern slopes. Some building structures, such as stone basements and plastered floors, were visible in a section of the northern cut. Following the cleaning of these structures in 1992, we concluded that the tell has Neolithic cultural layers that
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are at least 2 m thick. Retrieved objects include many flint points, truncated and crescent-shaped sickle elements, scrapers, obsidian micro-blades, DFBW, and Coarse Ware potsherds. According to their typological features, we suppose that the Neolithic layers at Tell Ghafar 1 cover at least from the Rouj 1c period to the Rouj 2d period. A small number of Fine Painted Ware sherds, including a Halaf-like variety, were also collected. Therefore, Tell el-Ghafar 1 was probably occupied during the Rouj 3 period as well.

RB027 Tell el-Ghafar 2: This is located about 1 km south of Tell el-Ghafar 1. It is a small, low, unnoticeable tell, badly damaged by the construction of a new canal in the late 1990s. Therefore, the original tell shape is not visible. The present tell has an irregular plan, measuring about 100 m by 100 m, and its height relative to the surrounding plain is only 1 m (Fig.5-13). The potsherds are sparsely distributed across the tell surface. Most of them are Byzantine and Islamic varieties. However, very few Rouj 2 potsherds also exist among the surface collections. Unfortunately, they are not useful in identifying the specific sub-period.

RB028 Tell el-Mazoule: This is located in the northwestern part of the basin. The limestone ridge looks like a solitary rocky hill from the flood plain. This limestone ridge is about 30 m high above the plain and commands a fine view from the top. Tell el-Mazoule was formed on the top of this limestone ridge (Fig.5-14). It is a small tell with thin cultural layers. It extends about 70 m to the north-south and 80 m to the east-west direction. The cultural layers are about 4 to 5 m thick. Tell el-Mazoule does not seem to have been an ordinary settlement because the location of the site is unique, and its cultural debris indicates a short-term occupation. Potsherds from the Iron Age and Roman-Byzantine periods are the most numerous. However, Neolithic materials, such as potsherds, flints and obsidians, are also distributed around the tell surface. The DFBW is the main variety among the Neolithic potsherds. Some fragments have nail-impressed decorations, typical of DFBW from the Rouj 2b period. Most of them are without decoration, though, and their fabric and forms seem to be similar to those of the Rouj 2c specimens. Coarse Ware potsherds, flint, and obsidian chipped stones were also present. It is clear that people used the limestone ridge of el-Mazoule during the Rouj 2b and 2c periods.

RB029 Tell Hommos: This is located at the mouth of a small valley between a limestone ridge and the western mountains, about 300 m southwest of Tell el-Mazoule. It has a roughly circular plan with a gentle conical shape. Its diameter is around 180 to 160 m, and its height relative to the surrounding plain is 9 m (Fig.5-14). The distribution of potsherds is relatively sparse, and few
potsherds that can help identify the period are available. We can identify Early and Middle Bronze Age and Iron Age potsherds among the surface collections. Some flint chipped stones (including both crescent-shaped and truncated blade-type sickle elements and scrapers), obsidian micro-blades, and ground stone axes, all of which probably belong to the Rouj 2c and 2d periods, are noticeable in the surface collections. In addition to the stone implements, there are some Neolithic Coarse Ware sherds. One fragment of Ubaid-like painted pottery was also collected.

**RB030 Tell Aqrabat:** This is located in the central western part of the Rouj Basin, about 500 m away from the foot of the western mountains. The original shape of Tell Aqrabat has been drastically changed through human activity. The present plan of the tell has a roughly oval shape, measuring 120 m from north to south and 180 m from east to west. Its height relative to the surrounding field is 13 m (Fig.5-15). Roman-Byzantine potsherds were distributed all over the tell. Many cultural layers were observed in the sections cut by a modern canal. Some of the plain ware sherds collected from this western cut are probably of the EB varieties. Some DFBW that was collected seemed to belong to the Rouj 2d variety, as some of them had pattern burnishing decorations. However, very few potsherds among the large number of Roman-Byzantine varieties could be of help in identifying the period.

**RB041 Tell el-Riz:** This is located in the south of the Rouj Basin, 1.37 km NNW of Tell Mallowan 1. The tell has a round plan with a diameter of between 120 and 130 m and is only 3 m above the surrounding plain (Fig.5-16). Although Roman-Byzantine and Islamic potsherds are distributed around its surface, the more noticeable surface collections are flints and potsherds belonging to the Rouj 2 and 3 periods. An Aswad-type point is also notable, because it indicates the existence of a Rouj 1a cultural layer. An agricultural canal was under construction at the southern foot of the tell when we visited in August 2003, and numerous DFBW and Red Washed Ware (Cream Ware) potsherds could be collected from the section of this canal ditch. The DFBW is of a relatively thick specimen and lacks surface decoration. Some rim sherds of so-called 'Bow-rim jars' were included among the Cream Ware. Most of the Cream Ware potsherds have a lustrous reddish wash. Some fine painted ware sherds were also collected, including Halaf-type potsherds similar to the Middle and Late Halaf varieties in Jazirah. All of these indicate that the prehistoric layers at Tell el-Riz date to the Rouj 1a, Rouj 2d, Rouj 3 (Chalcolithic), Roman-Byzantine, and Islamic periods.

**RB043 Tlaylat al-Gab South:** This is a small low mound, south of Tell
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Izhan in the northern part of the Rouj Basin. The site is in an agricultural field and has been heavily damaged by cultivation. It has a roughly circular plan, with a diameter of less than 100 m and a height less than 1 m. Artificial materials were only sparsely scattered on the mound surface. However, considerable amounts of Rouj 2c and 2d potsherds and chipped flints were present. A few Byzantine potsherds were also collected, but they had probably been scattered from the neighboring Byzantine mound.

**RB044 Ard Jusr:** This is a low mound about 2 km southwest of Tell el-Kerkh 1. It is located on the central plain of the basin. Archaeological materials are scattered around an area measuring about 200 m in diameter, and the mound is at a height of only 1 m relative to the surrounding plain. Chipped stones and pottery from surface collection indicate that the site includes Rouj 2d and early Rouj 3 cultural layers. A few Roman-Byzantine potsherds were also present.

We believe that the adjoining three tells at Tell Aray and Tell el-Kerkh probably formed a large settlement during the Neolithic era, and we counted nineteen Neolithic settlements in the Rouj Basin. Table 1 shows the estimated occupation period and estimated largest settlement size for each Neolithic tell. Most of the Neolithic settlements in the Rouj Basin are small, measuring less than 2 ha. Some of these small sites were probably not habitation settlements but temporary flint workshops (Tell Marwan 2), campsites (Tlaylat), or watchtowers (Tell el-Mazoule). Therefore, these sites must have been connected to and organized with other settlements during the occupation periods.

We summarize the transition of settlement patterns in the Rouj Basin during the Neolithic periods as follows.

**Rouj 1a (Fig.6-1):** Two small settlements of less than 1 ha appeared in the south of the Rouj Basin. As for Tell el-Kerkh, we excavated the settlement of this period only from the Northwest Area of Tell Ain el-Kerkh. The cultural layers were thinner than 1 m. The size and term of the Rouj 1a settlement at Tell el-Kerkh must have been small and short. Tell el-Riz is another Rouj 1a settlement. However, only a few flint tools indicate the existence of a cultural layer for this period. As the site is c. 1 ha at most, the settlement of the Rouj 1a period must have been small.

**Rouj 1c (Fig.6-2):** The layers belonging to this period were identified at three sites. The settlement at Tell el-Kerkh became very large, probably as large as 16 ha. Its size will be discussed in detail later. The evidence of settlement for this period at Aray is still suggestive, but it may have been larger than 5 ha. The settlement at Tell el-Ghafar 1 was probably c 1.5 ha. Therefore, there were two clear classes of settlement size during the Rouj 1c period. The number of
Fig. 6 Settlement Patterns of the Rouj Basin in Each Neolithic Period
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settlements during this period is only three, but their total extent exceeds 20 ha. Therefore, the Rouj Basin had a large population during this period.

**Rouj 2a-b (Fig.6-3):** It is not easy to distinguish the Rouj 2a period from the Rouj 2b period because the only characteristic indicator for the former is the existence of Kerkh Ware; other materials from the periods are quite similar. In addition, the term of the Rouj 2a period seems to have been relatively short, less than 100 years. Therefore, we treat both periods together here. Nine Rouj 2a-b settlements were identified. Most of them, except Tell Aray and Tell el-Kerkh, are small (smaller than 2 ha). As will be detailed later, the settlements at Tell el-Kerkh and probably those at Tell Aray were smaller than those of the previous period. However, the settlement at Tell el-Kerkh might still have been c.10 ha in total during this period. Therefore, there were two clear classes of settlement size: two large and seven small sites. We can thus identify the following changes from the previous period: (1) the number of settlements increased and (2) the size of the large settlements decreased. We may interpret this phenomenon by assuming that the people disassembled two large settlements and established new smaller settlements around each large one.

**Rouj 2c (Fig.6-4):** Sixteen settlements were occupied during the Rouj 2c period. The number of settlements was greatest during the Neolithic periods. The settlement pattern is very similar to that of the previous period, with two large settlements and fourteen small satellite settlements. However, the large settlements were downsized further. The size of the Tell el-Kerkh settlement decreased to around 6 ha. Among the satellite settlements, a flint workshop (Tell Marwan 2), a campsite (Tlaylat), and a watchtower (Tell el-Mazoule) existed included (as mentioned above), and they must have been connected to other large and small settlements. Settlement downsizing and networking between settlements were the most remarkable characteristics of this period.

**Rouj 2d (Fig.6-5):** Thirteen settlements were occupied during the Rouj 2d period. The large settlements seemed to shrink drastically. For example, the settlement at Tell el-Kerkh seems to have been only c. 1 ha large. By this period, there were no longer any large settlements within the Rouj Basin, and no specific sites, such as workshops or watchtowers, have been identified. Therefore, thirteen small settlements, all smaller than 2 ha, seem to have been separately distributed in around the basin.

**Rouj 3a (Fig.6-6):** Seven small sites were registered as Rouj 3a settlements. The downsizing and dispersal of settlements progressed. Though we registered nineteen Neolithic sites within the Rouj Basin, it is clear that these sites were not inhabited simultaneously. Using a precise local
chronology, we reconstructed a detailed settlement pattern for each period. The transition among settlement patterns in the Rouj Basin might reflect local and regional histories during the Neolithic periods.

We can say that there were two classes of settlement size, large and small. Two large settlements, Tell el-Kerkh and Tell Aray, had a long habitation sequence, from the Rouj 1a or Rouj 1c period to the Rouj 2d period (through to much later periods), while most of the small sites (those smaller than 2 ha) were short-term settlements or temporary special-purpose sites. The settlement sizes of Tell el-Kerkh and Tell Aray reached their maximum extent during the Rouj 1c period, the former apparently expanding to around 16 ha and the latter to over 5 ha.

The next problem is the meaning of these two sites’ sizes. Was their extent only apparent, or was it real? Did these large sites play an important role in Neolithic regional society? To consider the problem of the simultaneity of the whole settlement area, let us proceed to a discussion of Tell el-Kerkh.

IV. Tell el-Kerkh and the Excavations
Tell el-Kerkh, located in the southern part of the Rouj Basin, is a very large tell complex consisting of three artificial mounds: Tell el-Kerkh 1, Tell el-Kerkh 2, and Tell Ain el-Kerkh (see Fig. 7) from south to north. Tell el-Kerkh 1 has an irregular rectangular plan measuring c. 400 m by 400 m and a height of over 30 m relative to the surrounding plain. This tell seems to have had fortification walls dating to the EB, MB, or Iron Age. However, as some Neolithic objects could be collected from the surface of Tell el-Kerkh 1, evidence of Neolithic occupation might have accumulated below thick post-Neolithic deposits.

The south end of Tell Ain el-Kerkh was also covered with Roman-Byzantine cultural layers. However, Tell el-Kerkh 2 and most parts of Tell Ain el-Kerkh contain only Neolithic layers. The University of Tsukuba mission excavated a test pit on the summit of Tell el-Kerkh 2 in 1992 and discovered a good cultural sequence from the Late PPNB to the Early Pottery Neolithic periods. Based on this result, we established the Rouj 1c, 2a, and 2b chronology (Iwasaki and Tsuneki 2003).

A Syro-Japanese joint archaeological mission, consisting of the Directorate-General of Antiquity and Museums and the University of Tsukuba started excavations at Tell el-Kerkh in 1997. Since then, we have excavated c. 650 m² at the center of Tell Ain el-Kerkh, c. 200 m² at the northwest of Tell Ain el-Kerkh and (as mentioned above) 25 m² at the center of Tell el-Kerkh 2. Additionally, 11 test pits and one long trench (60 m by 2.5 m) were excavated at
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Fig. 7 Tell el-Kerkh
various parts of Tell Ain el-Kerkh (Fig. 9). In all of these excavated areas, thick Neolithic cultural deposits were discovered. In the Northwest Area, the cultural layers date back to the Early PPNB (Rouj 1a period). At the summit of Tell Ain el-Kerkh, the latest Neolithic deposits date to the Late Pottery Neolithic period (Rouj 2d period). According to $^{14}$C dating, the Neolithic cultural deposits at Kerkh cover approximately 2900 years.

In considering settlement sizes during each Neolithic period (from the Rouj 1a period to the Rouj 2d period), I would like to summarized the results of the excavations in each area and square (see Fig.8).

Central Area (Squares E251 to E311): At the northern summit of Tell Ain el-Kerkh, we set seven 10 m by 10 m squares and dug to a depth of c. 2.2–3.5 m from the tell surface during 12 seasons. These excavated squares were called the “Central Area,” and at least seven building layers were encountered. Layers 1 to 3 belong to the Rouj 2d period and are c. 0.8 to 1.8 m thick, and layers 4 to 7 belong to the Rouj 2c period and are over 2 m thick (Fig.8). These layers produced various kinds of structures, such as ordinary habitation houses, storehouses, tannors, a mill house, and a cemetery, presenting us with much information about the Pottery Neolithic life (Tsuneki et al. 2007, 2011). As the cultural deposits at the Central Area totaled over 10 m, the thick Early Pottery Neolithic (the Rouj 2a-b) and LPPNB (the Rouj 1c) layers must have accumulated below the exposed layers.

Northwest Area (Squares D6 to D26): Two 9 m by 9 m squares were excavated in the northwestern part of Tell Ain el-Kerkh. Below the surface layer, we encountered the Rouj 2a-b layers (layers 1 and 2), having a thickness of c. 0.5 m. Then, c. 3.2-m-thick Rouj 1c deposits were encountered (layers 3 to 6). Between the Rouj 1c layers and the virgin soil at 224.5 m asl, Early PPNB layers (layers 7 to 9) of c. 0.8 m thickness had accumulated, from which we identified the Rouj 1a period (Fig.8).

Northern Frontier (Square A318): A 5 m by 5 m trench was set in Square A318d to investigate the northern frontier of the LPPNB and Early PN settlement. We excavated only the top two layers, by digging to a depth of 0.6–0.8 m from the tell surface (Fig.8). Upon removing the surface soil, we encountered a layer 1 building structure with burnt mud plastering. Layer 2 produced many stone clusters. Aside from the cultivated surface soil, layer 1 produced only five small potsherds, and layer 2 produced three potsherds. These did not include any potsherds that could help in identifying the period. Most of them seem to be Neolithic varieties, but there are no obvious Rouj 2a or 2b potsherds. In stark contrast to pottery, a large number of flints and a certain
Fig. 8 Section Drawings of Excavation Squares and Trenches
amount of obsidian with many animal bones were found in both layers. Among the lithic objects, Byblos and Ugarit types were the predominant points, while no Amuq points were discovered. Large blades, detached from the Naviform cores, were also conspicuous. All these characteristics indicated that layers 1 and 2 in Square A318d might belong to the Rouj 1c (Late PPNB) period.

Square B230: This is one of the northernmost trenches along the middle axis of Grids BE. Below the surface layer, fourth millennium potsherds were obtained from layer 1 (0.2 m thick). Rouj 2c structures appeared in layer 2. We stopped digging when these structures were revealed (Fig. 8).

Square B290: A 2 m by 1 m trench was set 60 m south of Square B230. We dug to a depth of 1.8 m from the tell surface (Fig. 8). The first layer below the surface soil seemed to have accumulated naturally. Below this layer, Rouj 2c structures, a stone cluster and a hearth, were exposed at the bottom of the trench. We stopped the dig at this level.

Square D11: A 9 m by 2 m trench was set 40 m east of Square D6. This trench was dug 5.2 m deep from the tell surface (Fig. 8). The uppermost 1.5 m layer produced weathered potsherds, flint fragments, and animal bones. Below this layer, a 1.2-m-thick grayish brown sticky layer had accumulated. Both layers were sterile, and no solid structure was detected. It probably consisted of soil carried by wind from other parts of the tell and accumulated there. Four occupation layers over 1.2 m thick had accumulated. These layers produced only Neolithic materials, especially those of the Rouj 2c period. The dig was stopped at 226 m asl when water gushed out. Therefore, we do not know whether earlier cultural layers are present below this layer. However, as the water level was not so different from that of Square D6, the bottom of this trench seemed to almost reach virgin soil.

Square D16: This is a 2 m by 1 m trench set along the northern axis of Grid DEF. The upper two layers, c. 2.5 m thick, were similar to the upper two layers of Square D11 and were probably weathered and naturally accumulated soil. Below these layers, solid Rouj 2c structures were revealed (Fig. 8). As we did not want to destroy the pisé walls and lime plastered floor, we stopped digging.

Square E1: This is also a 2 m by 1 m trench set along the northern axis of Grid DEF. Removing the surface soil, we directly encountered Rouj 2c cultural layers. As we dug through the debris of the Rouj 2c period, a pisé wall appeared just below the plaster floor. We stopped the dig at the 234 m asl, c. 1.4 m below the tell surface (Fig. 8).

Square E10: This 9 m by 9 m trench was set in the northern terrace of Tell
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Ain el-Kerkh at the beginning of the excavations in 1997. Curiously, however, the upper 2.2 m deposits were quite sterile. No solid structures and few objects were discovered in the upper deposits. When we reached layer 6, inside the trench changed drastically. The excavated square was full of structures, such as pisé walls and stone rows. The materials obtained from this layer belong to the Rouj 2c period (Fig.8). Therefore, we concluded that the Rouj 2c settlement expanded into this area and that the settlement was then abandoned. Subsequently, it was covered with the sterile brown soil from other parts of the tell and from outside. We stopped digging and buried the trench for preservation.

**Square F1:** This is the easternmost 2 m by 1 m trench along the northern axis of Grids DEF and located at the eastern foot of Tell Ain el-Kerkh. Removing the surface layer, we encountered artificially accumulated Neolithic layers, which reached a thickness of at least 3.4 m (Fig.8). Some layers produced pisé bricks and ash deposits; thus, the place was certainly included within the Neolithic habitation area. The excavated materials indicate that the upper six layers belong to the Rouj 2b and that the lowest layer 7, belongs to the Rouj 1c period. Below layer 7, red-brown fan deposit soil appeared, which might be virgin soil.

**Square E110:** This is located in the middle between the Central Area and Square E10. Below the surface soil, Neolithic structures appeared. The structures seemed to have been crowded. Thus, when we dug 1.2 m from the tell surface, we stopped (Fig.8). The exposed layers all belong to the Rouj 2c period.

**Squares G191 and 192:** This is the westernmost trench, measuring 10 m by 1 m, set on the southwestern terrace of Tell Ain el-Kerkh. The top layer (between the surface and 0.4 m down) produced large amounts of Roman-Byzantine potsherds scattered from the southern summit of Tell Ain el-Kerkh. Under the top layer, stone rows appeared and became fully revealed in the trench. The materials found with these walls indicated that the structures belong to the Rouj 1c period. Three structural layers from Rouj 1c were recognized in this trench. From the lower layers, some pisé bricks and a flint cache were recovered. The thickness of the Rouj 1c deposits measured over 1 m. We did not reach virgin soil in this trench.

**East Trench (Squares E272 to E277):** This trench was set on the eastern slope of Tell Ain el-Kerkh, just east of the Central Area. It was 2.5 m wide, 60 m long, and divided into six squares, E272 to E277, following Tell el-Kerkh’s grid system. Each square was dug to a depth of about 1.4 to 3.6 m from the tell surface (Fig.8). The cultural deposits were divided into nine layers, although the step trench produced a few layers in each square. A sterile surface layer, which
seems to have been driven and accumulated by the wind and agricultural activities, was randomly distributed in the trench. Upon removing this surface layer, we encountered superimposed Rouj 2d buildings in layers 1 to 3. As layer 3 disappeared in Square E274, the Rouj 2d settlement extended into it. The lower layers 4 to 6 produced a building series from the Rouj 2c period. These layers were cut by a large post-Neolithic pit in Square E275 and disappeared into the east of this square. Layers 7 and 8 belong to the Rouj 2b period and sometimes reach a thickness of nearly 2 m. Layer 8 disappeared at the eastern end of the trench. Layer 9, the Rouj 1c layer, was discovered in Squares E275 to E277. At the bottom of Squares E275 to E276, we discovered a storehouse, as mentioned below. The Rouj 1c settlement must continue further east.

Tell el-Kerkh 2 Test Pit: This test pit was set on the summit of Tell el-Kerkh 2. The TP measured 5 m by 5 m and was dug down to virgin soil, 4.8 m from the tell surface (Fig.8). The deposits were divided into twelve layers. The uppermost layers, 1 to 4 (c. 1 to 1.2 m thick) belong to Rouj 2b, layers 5 to 6 (c. 1.0 m thick) to Rouj 2a, and layers 7 to 12 (between 2.2 and 2.6 m thick) to Rouj 1c. Based mainly on the excavation results of this TP, we established the chronology for Rouj 1c to Rouj 2b (Iwasaki and Tsuneki 2003).

V. The Size of Neolithic Settlement at Tell el-Kerkh during Each Period
In addition to the excavations, I undertook a detailed surface collection for the whole tell complex in 1994. I collected the Rouj 1 or Rouj 2 lithics and Rouj 2 potsherds from all of the fixed squares at the northern half of Tell Ain el-Kerkh and everywhere in Tell el-Kerkh 2. Additionally, a few Rouj 1 or Rouj 2 lithics and Rouj 2 potsherds could be collected from the southern end of Tell Ain el-Kerkh and the southern slope of Tell el-Kerkh 1. Therefore, it is very probable that most parts of Tell Ain el-Kerkh and the whole of Tell el-Kerkh 2 were occupied during some of the Neolithic’s periods.

Based on the results of excavations, test pits, and surface collection, I have tried to estimate the settlement size of each Neolithic period at Tell el-Kerkh.

Rouj 1a period: Only the Northwest Area of Tell Ain el-Kerkh has so far produced Rouj 1a cultural layers. No other excavations that reached virgin soil (Test Pit of Tell el-Kerkh 2 and Square F1 of Tell Ain el-Kerkh) produced layers belonging to this period. Therefore, we may conclude that the area of the Rouj 1a settlement was quite limited, around the low summit of Northwest Area of Tell Ain el-Kerkh. The estimated size of the Rouj 1a settlement is smaller than 1 ha (Fig.9-1).

Rouj 1c period: The Neolithic settlement expanded drastically during the
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Rouj 1c period, reaching the largest size in the history of Tell el-Kerkh. All the excavated squares that reached virgin soil, except Square D11, produced Rouj 1c cultural layers, firmly indicating that a huge LPPNB settlement lay at the basement of the whole Tell el-Kerkh 2 area and almost the whole Tell Ain el-Kerkh area. The southern foot of Tell el-Kerkh 1 might have been an isolated patch of the Rouj 1c settlement, because of the Rouj 1c materials there. As the deep test pit of Square D11 did not produce Rouj 1c layers, the Rouj 1c settlement of the Northwest Area was probably separated from the main Rouj 1c settlement at Tell Ain el-Kerkh. On the other hand, as Squares G191 and G192 produced Rouj 1c layers, Tell el-Kerkh 2 and Tell Ain el-Kerkh seem to have formed one large settlement. It is supposed that the Rouj 1c settlement expanded over 16 ha in total (Fig.9-2). Though we must testify to the simultaneity of the areas, the evidence indicates that it had been a quite large settlement during the Rouj 1c period.

**Rouj 2a-b period:** As we did not dig the lower deposits below the Rouj 2c layers in most of the excavated squares, we encountered the Rouj 2a-b layers only in the Test Pit of Tell el-Kerkh 2, the Northwest Area, the East Trench, and Square F1 of Tell Ain el-Kerkh. As the thick Neolithic cultural layers must have accumulated below the Rouj 2c layers, we can assume a relatively large Rouj 2a-b settlement. On the other hand, we did not find Rouj 2a-b layers at Squares G191 and G192, D11, or A318. In these squares, we directly encountered the Rouj 1c layers. Therefore, the settlement might have been separated into at least three areas: Tell el-Kerkh 2, the Northwest Area, and the main part of Tell Ain el-Kerkh (Fig.9-3). We may estimate the settlement size of each area as 2 ha, 0.6 ha, and 7 ha respectively. In total, the settlement of the Rouj 2a-b period was about 10 ha. It is not easy to determine if these areas were occupied simultaneously; we will discuss this problem later.

**Rouj 2c period:** Though we encountered Rouj 2c layers in most of the excavated squares set in the northern part of Tell Ain el-Kerkh, we did not find this period's layers at Tell el-Kerkh 2 and the Northwest Area of Tell Ain el-Kerkh. This means that the settlement area of the Rouj 2c period was mostly limited to within the main part of Tell Ain el-Kerkh (Fig.9-4). The southern and eastern edges of the settlement were clearly reduced. In other words, the people concentrated their habitation area in the north central part of Tell Ain el-Kerkh during the Rouj 2c period. The results of excavations in the Central Area showed us a densely populated settlement, which can be estimated as having been c. 5-6 ha during this period.

**Rouj 2d period:** Only the Central Area and the East Trench produced Rouj
Fig. 9-1  Habitation Area during the Rouj 1a Period
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Fig. 9-2  Habitation Area during the Rouj 1c Period
Fig. 9-3 Habitation Area during the Rouj 2a-b Period
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Fig. 9-4  Habitation Area during the Rouj 2c Period
Fig. 9-5 Habitation Area during the Rouj 2d Period
2d layers; the Rouj 2d settlement was clearly much smaller than the previous settlements. As the Rouj 2d layer disappeared below the 238 m asl. contour line in the East Trench, this level might be the limit of the settlement. Therefore, it is supposed that the settlement size did not exceed c. 1 ha (Fig. 9-5).

When we glance at the grid sections of Tell Ain el-Kerkh (see Fig. 9), relatively thick sterile surface layers were recovered throughout, especially in the northern part of Tell Ain el-Kerkh. The original tell surface might have been rugged, and later natural and human activities may have leveled it. Therefore, the tell complex of Kerkh originally consisted of a few separated habitation areas, and each area seems to have been occupied successively.

This condition can be observed typically in the case of the Rouj 2a-b settlement because the settlement was separated into a few areas during this period, as mentioned above. When considering the simultaneity and continuity of these areas during the Rouj 2a-b period, we notice the differences in the percentages of Kerkh Ware for each area (see Table 2).

Table 2. The Proportion of Kerkh Ware in each Excavated Square during the Rouj 2a-b Period.

<table>
<thead>
<tr>
<th>Area</th>
<th>Square</th>
<th>Layer</th>
<th>proportion of Kerkh Ware</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kerkh 2 Test Pit</td>
<td>Layers 2, 1</td>
<td>33–42% in the whole pottery assemblage</td>
<td></td>
</tr>
<tr>
<td>Ain el-Kerkh East</td>
<td>East Trench</td>
<td>Layers 8, 7</td>
<td>a few</td>
</tr>
<tr>
<td>Kerkh 2 Test Pit</td>
<td>Layers 4, 3</td>
<td>very few</td>
<td></td>
</tr>
<tr>
<td>Northwest Area</td>
<td>D6</td>
<td>Layers 2, 1</td>
<td>none</td>
</tr>
<tr>
<td>Kerkh 2 Test Pit</td>
<td>Layers 2, 1</td>
<td>none</td>
<td></td>
</tr>
</tbody>
</table>

It seems that the percentage of Kerkh Ware decreased as time progressed. If this was the case, we can suggest the inhabitants movement at Tell el-Kerkh as follows: first, the Rouj 2a-b people settled at Tell el-Kerkh 2; they then moved to the main area of Tell Ain el-Kerkh; and then returned to the area of Tell el-Kerkh 2, occupying the same area and/or moving to the Northwest Area of Tell Ain el-Kerkh.

Based on the series of $^{14}$C dating, the Rouj 2a-b period covers c. 400 years, from c. 7000 to 6600 cal BC (see Table 1). If the abovementioned relocation occurred, the Rouj 2a-b people at Kerkh moved their habitation area every c. 80 to 100 years within the settlement.

However, the area sizes in each stage were quite different. The main area of Tell Ain el-Kerkh (c. 7 ha) might have been three and a half times as large as Tell el-Kerkh 2 (2 ha) and twelve times as large as the Northwest Area (0.6 ha).
of Tell Ain el-Kerkh. If the original settlement size was c. 2 ha and they kept the same settlement size throughout their relocations, they must have moved three and a half times within the main area of Tell Ain el-Kerkh. Therefore, they must have moved at least seven times in order to produce the current total area sizes. In this case, the people would have moved their habitation area at least every 60 years.

We must note that relocation at 60-year intervals is too short and very far from realistic. The thickness of the cultural layers for one relocation episode measures c. 1.0 m for layers 6 to 5 at Tell el-Kerkh 2, 0.5 m for layers 4 to 3 at Tell el-Kerkh 2, and nearly 2 m for layers 8 to 7 at the East Trench of Tell Ain el-Kerkh (see Fig.8). We consider that 1 to 2 m is too thick for 60 years of cultural accumulation. Neolithic people frequently leveled the ground for their habitation areas, and the accumulation of cultural debris must have happened much more slowly. An accumulation of 2 m of cultural debris must have taken a few hundred years under ordinary conditions.

If we consider the cultural accumulation at the Central Area of Tell Ain el-Kerkh, where the imposed Rouj 2c and 2d settlements were excavated to a larger extent, we can derive an example of the rate of cultural accumulation during the Neolithic periods. Seven main cultural layers, including more than a dozen building levels, were accumulated without any remarkable hiatus or intervals. The thickness of their cultural deposits is at most 3.5 m, and the term of the layers is c. 800 years, covering from 6,600 to 5,800 cal BC, based on $^{14}$C dating. In this case, the annual average thickness of cultural accumulation is 0.44 cm. If we apply this rate to the case of the Rouj 2a-b settlement, 26.4 cm is the maximum for cultural accumulation over 60 years.

Therefore, we conclude that a relatively large portion of the settlement area must have been occupied simultaneously, even though the people relocated within the settlement, especially given the thick cultural deposits during the period in question. In the case of the Rouj 2a-b settlement at Tell el-Kerkh, we must recognize that most of the main areas of Tell Ain el-Kerkh might have been occupied simultaneously and continuously, meaning that the size of the Rouj 2a-b settlement must have been c. 7 ha at least.

In the case of the Rouj 1c settlement, which might have reached Tell el-Kerkh’s maximum size, the situation is clearer. The thicknesses of cultural debris for the Rouj 1c period were 3.2 m for layers 3 to 6 in the Northwest Area and over 2 m for layers 9 at the East Trench (see Fig.8). Below the thick Rouj 2c cultural layers in the Central Area, the very thick Rouj 2a-b and Rouj 1c cultural layers, measuring over 7 m, remained. These cultural layers must have been
accumulated over the course of 1000 years, from 7600 to 6600 cal BC, based on $^{14}$C dating. If the Rouj 1c settlement was small, perhaps 2 ha, with people frequently relocating their habitation areas within the settlement, the cultural deposits must have been much thinner than the actual thickness. Therefore, it can be concluded that most of the Rouj 1c settlement, of about 16 ha, must have been occupied simultaneously and continuously during a fair portion of the period.

VI. Conclusion: Tell el-Kerkh as a Neolithic mega site

We may now conclude that the Neolithic settlement at Tell el-Kerkh was not merely large in appearance but was truly large, about 16 ha, during a significant term of the Rouj 1c period (LPPNB). However, in the subsequent Rouj 2 periods, the settlement shrank to c. 7 ha in the Rouj 2a-b period, c. 6 ha in the Rouj 2c period, and to less than 1 ha in the Rouj 2d period. Therefore, if we can define a mega site as a settlement larger than 10 ha, the Rouj 1c settlement at Tell el-Kerkh is the only mega site in the Rouj Basin.

Many scholars have pointed out that mega sites appeared and expanded in the Late PPNB period in each region of the Levant and that, at the beginning of the Pottery Neolithic period, there was a collapse in the PPNB way of life, eliminating the mega site throughout the Levant. As discussed here, an extra mega site appeared in the Rouj Basin and expanded during the Rouj 1c period. The reduction in settlement size at Tell el-Kerkh did not occur as drastically in the following Rouj 2a-b period, but the transition in settlement size from the Rouj 1c to the Rouj 2d periods fundamentally corresponds to those in other regions of the Levant.

If we consider the meaning of a mega site, it is necessary to investigate some aspects of social complexity. For the Rouj 2c and 2d periods, we have already some evidence of communal storage, communal cemetery, craft specialization, long-distance trade, the concept of ownership, and ritual practices, all of which indicate the existence of complicated societies (e.g., Tsuneki et al. 2007, 2011). As the Rouj 1c layers have not yet been excavated as extensively, we have not yet obtained enough evidence to explain this social complexity. However, blade blank caches with a large number of sickle elements (Tsuneki et al. 1999; Arimura 2011), a large obsidian primary core (Maeda 2003), a storehouse furnished with at least fourteen large bins (Tsuneki and Hydar 2008), a magnetite axe (Tsuneki and Hydar in press), a flog-shaped pendant (ibid.), and many other structures and objects discovered from the Rouj 1c context indicate communal storage, long-distance trade, and sophisticated
craftsmanship, suggesting a considerable level of social complexity. Though further discussion of the social complexity of the Rouj 1c community would require an additional study, all of this suggests that the Rouj 1c settlement was far beyond an ordinary village in a rural area.

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