TELL ES-SULTAN/ANCIENT JERICHO IN THE EARLY BRONZE AGE I-III: A POPULATION ESTIMATE

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The aim of this study is to establish a population estimate for the settlement of Tell es-Sultan/ancient Jericho, following its development from the Early Bronze I village up to the Early Bronze II-III fortified city. The archaeological contexts of the domestic quarter excavated in the northern plateau *of the tell (Area F in the Italian-Palestinian grid of excavations) provide a useful set of data for such a demographic analysis, allowing to draw out a picture of the population and demography of Jericho during the Early Bronze Age I-III.*

Keywords: Jericho; Early Bronze I-III; population; demography; domestic quarter

1. SETTLEMENT PATTERN IN THE JERICHO OASIS

The site of Tell es-Sultan/ancient Jericho is characterized by a very long-lasting occupation[1], from the Late Natufian (ca. 10500 BC) up to the Ottoman Period (1918 AD), made possible by its location in an environmental niche - the Jericho Oasis - with great abundance of fresh water sources, as the Spring of 'Ain es-Sultan, focus point in the history of human occupation throughout the oasis[2].

During pre-classical periods Jericho was the major site in the oasis, with the only exception for the Chalcolithic Period, when the site was settled but the main centre of the oasis shifted to the north-east at Tell el-Mafjar[3], along the banks of Wadi Nu'eima, and population was apparently distributed in a number of villages[4]: Tell el-Mafjar[5] (2 ha), Suwwanet eth-Thaniya[6] (0.5 ha), Tell Abu el-'Alayiq North and South[7] (12 ha), and Tell es-Sultan[8] (less than 1 ha). This settlement distribution continued during EB I (3500-3000 BC[9]), and only at the beginning of EB II (3000 BC) a fortified city was established at Tell es-Sultan, which became the largest EB II-III settlement gathering within the population of the whole oasis.

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1 Except for Tell es-Sultan, archaeological sites in the Jericho Oasis were often one-period sites, with the population shifting throughout the oasis (Nigro 2011, maps 1-16).

2 Nigro 2014a, 25-27, figs. 1.1-1.2.

3 D'Andrea - Sala 2011, 128 (Site n. 54); Nigro 2011, 7-8, map 2.

4 Nigro 2011, 9-10, map 3; Tamburrini in this volume, §4.

5 Taha *et al.* 2004; Anfinset 2006; Anfinset *et al.* 2011.

6 D'Andrea - Sala 2011, 154-155 (Site n. 90).

7 Foerster 1993; D'Andrea - Sala 2011, 99-100, 102-105 (Sites nos. 1, 7).

8 Nigro 2011, 7-9.

9 For the chronology used in this study see: Nigro in this volume, §§ 6.1.-6.3.; Nigro *et al.* 2019.

2. Estimating the population size of EBA Jericho: methodology

Several methodologies were elaborated in order to define realistic estimates of ancient populations. Most of these analyses were based on the application of population density coefficients (= people per ha), derived from ethnographic researches, and applied to total sites' extension to establish the population density of a region. Studies on Southern Levant population during the Bronze and Iron Ages employed coefficients ranging from 100 to 500 people per ha, with the largest attestation for a model using a coefficient of 200-250 people per ha[10], which produced maximum estimates regardless the intra-site organization and settlement size variability.

The attempt to estimate the population of a single settlement is quite different, according to a number of variables, such as architectural features and availability of natural resources[11]. Several studies on site-specific population estimates were derived from the analysis of the archaeological evidence of domestic contexts. These methodologies were based on the calculation of dwelling unit size and number of dwellings per person[12], in order to obtain accurate and reliable total site population estimates[13]. These analyses were based on the assumption that dwellings were occupied by nuclear families, therefore the average family size (or household size) should be defined. For the application of these models two parameters are required: sites should be extensively excavated to discern the functional zones of the settlement; excavated domestic areas should be large enough to establish a population density coefficient (= individual per dwelling) applicable to the whole settlement.

Ethnographic researches on pre-industrial and pre-modern villages provided models to define both the space per person[14] (i.e. extension of the residential floor area in which people lived and slept), and the number of individuals per dwelling[15] (i.e. the size of a nuclear family), encompassing a wide range of societies.

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10 Broshi - Gophna 1984; 1986; Broshi - Finkelstein 1992; Harrison 1997.

11 Zorn 1994, 31-32.

12 Naroll 1962; LeBlanc 1971; Marfoe 1980; Stager 1985; Brown 1987; Swinnen 2009.

13 Population estimates derived from the analysis of domestic compounds took into account the presence of roofed and unroofed spaces within a dwelling, where many activities occurred, including production, storage and consumption of food, and also craft production. Several examples of residential units were documented by excavations throughout the Southern Levant such as at Arad (Ilan 2001, 319-328), et-Tell/'Ai (Wagner 1972; Ilan 2001, 328-334), Tell Abu al-Kharaz (Fischer 2008), Tell el-'Umeiri (Harrison 2000, 95-154), Khirbet ez-Zeraqon (Genz 2002).

14 Ethnographic research on Southwest Asian villages produced different coefficients of floor area per person, ranging from 5-7.5 m^2 (Naroll 1962; LeBlanc 1971) to 10 m^2 per person, with an average value of 6 m^2 per person (Brown 1987).

15 Studies on pre-industrial Middle Eastern societies and ethnographic research on Southwest Asian villages, matched with archaeological evidence from EBA sites, were conducted in order to define the composition of a typical Southern Levantine nuclear family. Standard coefficients for a family size were suggested according to the dwelling extension: a family of three

Ethnographic data and archaeological investigations on Early Bronze Age domestic contexts revealed mean coefficients for residential floor areas of 6 m² per person[16], considering the average size of an Early Bronze Age nuclear family comprised in a range from three-to ten individuals.

Jericho represents an excellent case study for a population estimate during the Early Bronze Age. The site was extensively excavated and surveyed enough to know the total extension of the settlement, and to discern the extension of residential quarters and public areas throughout the whole EBA. Moreover, a large portion of a domestic quarter occupied from the EB I to the EB II-III was brought to light on the northern *plateau* of the tell, corresponding to Area F of the Italian-Palestinian grid of excavations[17]. A cross-analysis of site occupational sequence, site size, house size, and family size could be translated into a population estimate. In addition, an estimate for the non-residential spaces, including administrative and cult complexes and unused spaces (fortifications, city-gates, streets), was made to obtain a more reliable population model.

With these assumptions a population estimate for the site of Tell es-Sultan/ancient Jericho could be argued as shown below (tab. 1).

$$P_{estimate} = \frac{Nd \times 1\ ha}{F} \times (S - Y)$$

Nd = Number of people in dwelt area
1 ha = 10.000 m²
F = Extension of the excavated dwelt area in Area F
S = Total site extension
Y = Non-residential (public) areas extension

Tab. 1 - Summary of the calculations applied for Tell es-Sultan/Jericho population estimate.

individuals (father, mother and one children) is considered for residential floor areas of ±20 m²; a family of four-to-five individuals (father and mother, two-to-three children) for residential floor areas of 30+ m²; a family of seven-to-ten individuals (father and mother, three-to-four children, and perhaps some grandparents) for multi-living rooms houses with a residential floor area of 50+ m² (Marfoe 1980, 319; Aurenche 1981; Kramer 1982; Finkelstein 1990, 48-49).

16 Excavations at the site of Arad brought to light one of the most famous example of domestic architecture (Amiran *et al.* 1978; Amiran - Ilan 1996). L. Marfoe analyzed Arad as case study for a population estimate based on the analysis of house size, and suggested an index of 6 m² per person of residential floor area as the most realistic standard (Marfoe 1980, 318-319).

17 Nigro 2016, 10, figs. 2, 14.

3. The population of Tell es-Sultan/Jericho from EB I to EB II-III

Tell es-Sultan/ancient Jericho is one of the few case studies throughout the Southern Levantine EBA sites with a continuous occupational sequence which demonstrates the full transition from the Proto-Urban/EB I stage to the fully urban EB II-III stage. Archaeological data collected in the northern domestic quarter investigated in Area F allow to derive a demographic analysis following the various steps of the settlement development and population growth from the EB IA-B village to the EB II-III fortified city.

3.1. The village of Jericho during the EB IA (Sultan IIIa1, 3500-3200 BC)

At the beginning of EB I, after the partial occupational gap of the Chalcolithic Period, Tell es-Sultan/Jericho was re-occupied by a group of stable inhabitants, thanks to the renewed flow of the Spring of 'Ain es-Sultan, shifted or extinguished in the previous period[18]. The EB IA/Sultan IIIa1 rural village was investigated in the north-eastern sector of the tell[19] (fig. 1). It consisted of circular huts with sunken floor and a straw or adobe dome, located on top of three terraces sloping from west to east, the two lowest terraces separated by a massive terrace wall[20] (fig. 2). Houses were frequently grouped in couples, possibly corresponding to a household unit, and were arranged around open areas hosting storage facilities and food production devices, such as silos and stone platforms[21].

A portion of ca. 1,500 m^2 of the EB IA village was excavated[22], and six different dwelling units or compounds were clearly recognized[23].

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18 Nigro 2014a, 31; 2014b, 67-68.

19 E. Sellin and C. Watzinger first excavated a small portion of the EB I village (Sellin - Watzinger 1913, fig. 10; Nigro 2005, 8-10). The followed extensive dig was led by J. Garstang in the North-Eastern Trench (Garstang - Droop - Crowfoot 1935, 149-150, 153, pls. XXIVb, XXVI-XXVIII; Garstang - Ben-Dor - FitzGerald 1936, 73-74, pls. XXXIV-XXXVI; Nigro 2005, 23-34), and the two EB I sub-periods were distinguished for the first time (EB IA and EB IB were respectively represented by Level VII and Level VI). K.M. Kenyon excavated a small but important portion of the EB IA village in Trench II and Squares E III-IV, corresponding to Phases DD-R in the periodization elaborated by J.B. Hennessy (1967, 6-15; Kenyon 1981, 146-147, 315-321, pls. 100a, 249a, 313-314, 323e, g, h, j; Nigro 2005, 113-114).

20 Nigro 2005, 23-25, figs. 3.8-3.9; 2006a, 353-354; 2008, 647-648.

21 This domestic architecture finds comparisons in several EB I sites in Palestine and Jordan, such as Khirbet Khalalidya/Yftah'el, Khirbet Kerak/Beth Yerah, Tell Qassis/Tel Qishyon, Tell esh-Shuna North (Braun 1989, figs. 4, 11, 17; Sebag 2005, 224-225), and up to the Lebanese coast at Byblos (Nigro 2007, 22-23, figs. 26-27).

22 In the northern half of Trench II K.M. Kenyon excavated two circular huts, the largest one of 4.3 m of diameter (OBM), as usual flanked by a smallest one (OBO); a small portion of a third hut (OBR+OBN) was excavated immediately to the south (Kenyon 1981, 146-147, pls. 100a, 249a). These structures were preserved in a very bad way, and they just witness the extension of the EB IA village up to the northern slope of the tell.

23 Nigro 2005, figs. 3.15-3.16, 3.20-3.26.

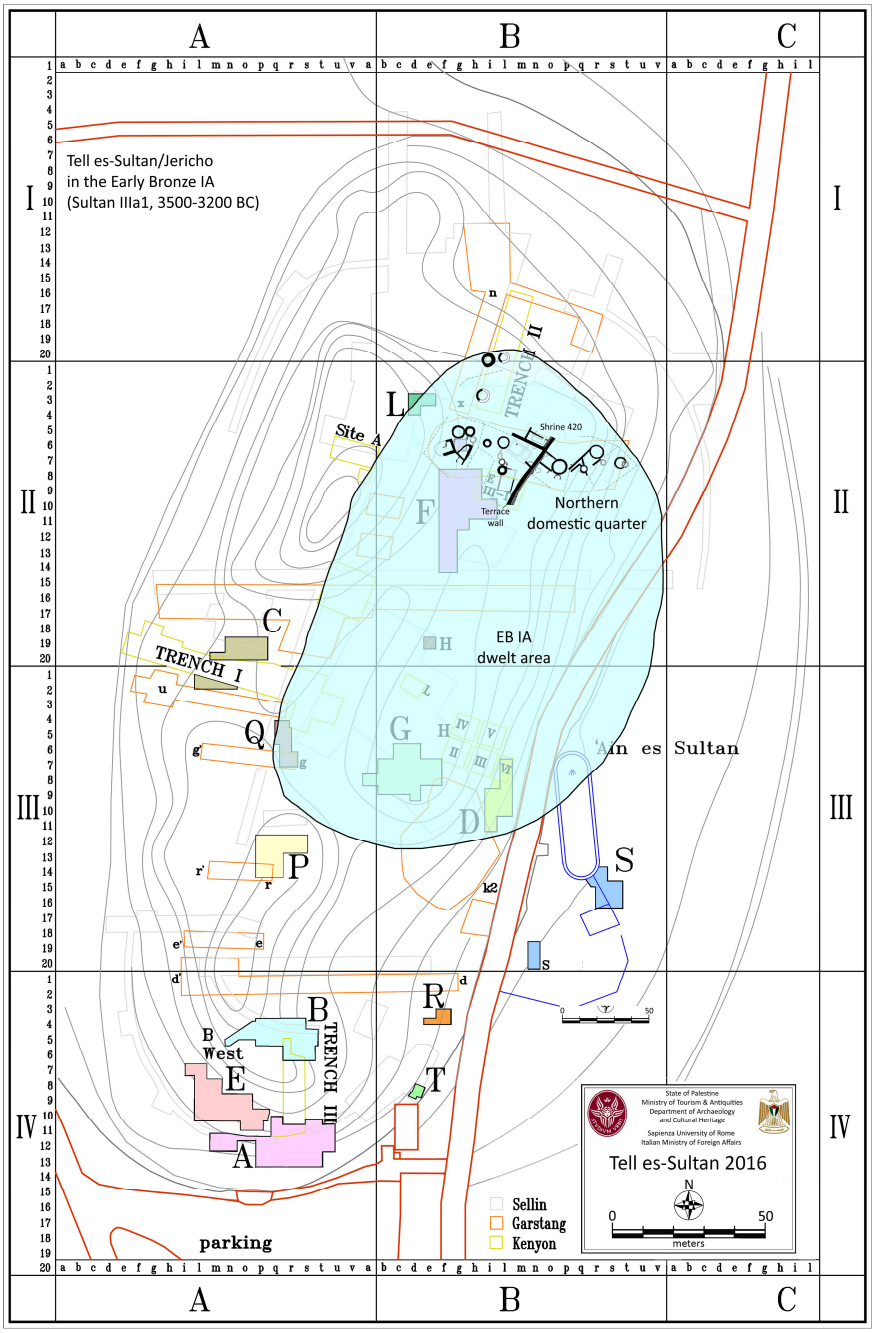

Fig. 1 - Reconstructive map with the estimated size of Tell es-Sultan/Jericho during the Early Bronze IA (Sultan IIIa1, 3500-3200 BC), with the plan of the village excavated in the northern *plateau* (after Nigro 2005, 119, fig. 4.11).

Fig. 2 - Western sector of the EB IA/Sultan IIIa1 rural village of Tell es-Sultan/Jericho with Huts 173+177 (after Nigro 2005, 26, fig. 3.16).

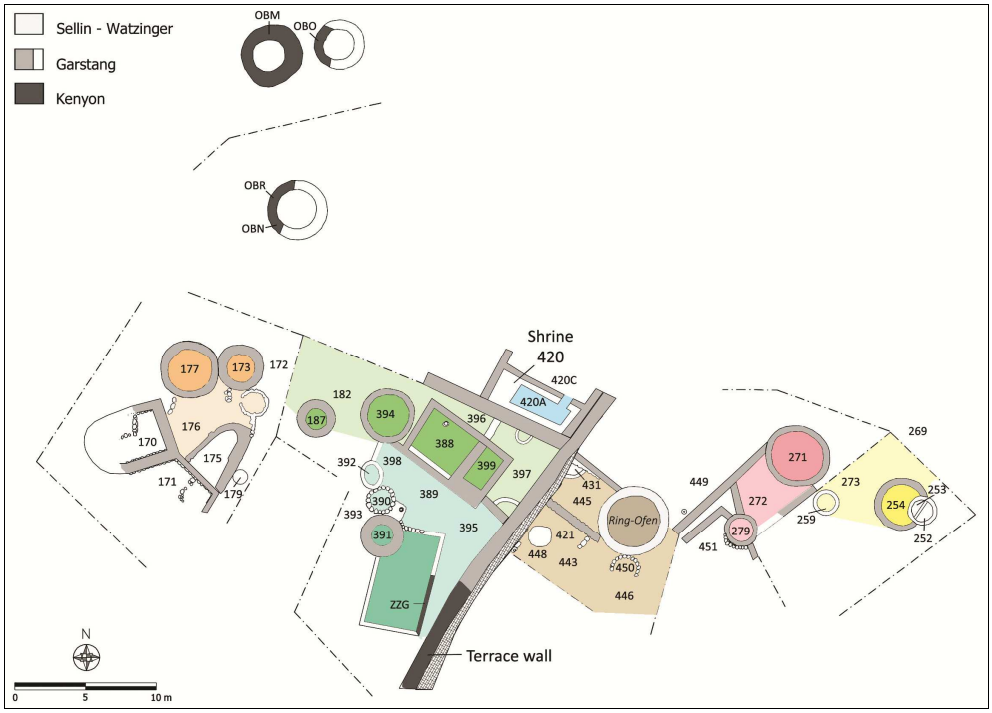

Fig. 3 - General plan of the EB IA/Sultan IIIa1 rural village excavated in Area F (after Nigro 2005, pl. II).

The houses were composed by a roofed/living area, corresponding to the pit-house, connected to an open courtyard with installations for food production. The westernmost house consisted of two huts (177+173) opened into a common courtyard (176). In the middle of the excavated area a major complex was composed by two circular huts (187+394), and a rectangular structure (388+399), opened into a «L-shaped» courtyard (396+397). Another domestic unit was excavated by J. Garstang further south, with a circular hut (391), a rectangular precinct leaning against it to the east, and a large courtyard to the north (398+389+395). Finally, in the easternmost terrace, at least three domestic units were brought to light, each one composed by a circular hut (*Ring Ofen*, 271, 254), and an open courtyard with silos and fireplaces.

The total living area comprises roughly the 6.4% of the excavated area, while the rest of the northern quarter was occupied by a religious compound[24] and unused spaces (courtyards, open spaces, and the terrace wall). This implies that during the EB IA, dwellings were sparse and irregularly displaced and the northern quarter was inhabited by 20/22 individuals in 6 nuclear families (tab. 2). With the assumption that the portion of EB IA village excavated in the northern *plateau* is representative of the total site extent, and based on the estimate of 20/22 individuals per 1,500 m², the population density for the EB IA village at Jericho, which had an extension of about 2 ha, would be ca. 260/280 inhabitants (i.e. 130/140 people per ha).

House	Functional components	Living area	Courtyard area	Total living area	Total house area	Number of people
House 173+177+176	Hut 173	3 m²	-	10 m²	30 m²	3 (1 family)
	Hut 177	7 m²	-			
	Courtyard 176	-	20 m²			
House 187+394	Hut 187	2 m²	-	28 m²	78 m²	4/5 (1 family)
	Hut 394	7 m²	-			
	Rectangular units 388-399	19 m²	-			
	Courtyard 397+396+182	-	50 m²			
House 391	Hut 391	2.5 m²	-	28.5 m²	58.5 m²	4/5 (1 family)
	Rectangular precinct (ZZG)	26 m²	-			
	Courtyard 395+389+398	-	30 m²			
Ring Ofen	Hut	12 m²	-	12 m²	62 m²	3 (1 family)
	Courtyard 445+446	-	50 m²			
House 271	Hut 271	10 m²	-	10 m²	37 m²	3 (1 family)
	Courtyard 272	-	27 m²			
House 254	Hut 254	8 m²	-	8 m²	28 m²	3 (1 family)
	Courtyard 273+Silos 259	-	20 m²			
Total house areas and family sizes				96.5 m²	293.5 m²	20/22 (6 families)

Tab. 2 - House areas and family sizes calculated for the northern domestic quarter (Area F) of the EB IA/Sultan IIIa1 village at Tell es-Sultan/Jericho.

[24] The so-called "Babylonian Shrine", or Shrine 420, was erected within the dwellings in a later phase of Sultan IIIa1 period (Garstang - Ben-Dor - FitzGerald 1936, 73-74, pl. XLIa; Garstang - Garstang 1948, 78-79, fig. 8; Nigro 2005, 33-34; Sala 2005; 2011, 5-6).

3.2. The village of Jericho during the EB IB (Sultan IIIa2, 3200-3000 BC)

The village underwent a progressive growth in the EB IB, with the reconstruction of the massive north-south terrace wall[25], while an east-west boundary wall was erected to delimitate the shrine terrace. The EB IB/Sultan IIIa2 village[26] was characterized by the presence of rectangular houses, sometimes with rounded corners (fig. 4)[27]. For the first time dwellings were organized into compounds of rectangular or trapezoidal shape, in a planned layout which provides the presence of public structures, such as a street running south-west/north-east[28], the so-called "Double Shrine"[29], and a great apsidal building probably devoted to community or extra-familiar functions[30].

Excavations brought to light a portion of ca. 1,000 m^2 of the EB IB/Sultan IIIa2 northern domestic quarter, and at least four dwelling compounds were identified (fig. 6)[31]. In the uppermost western terrace a major compound (164) flanked the street. The northern half of the central terrace was occupied by a composite house (House 362+372+379+374)[32], with a tripartite broad-room, a circular hut, directly connected to a large courtyard (162+169+365) and a rear open space (380) with a silos and a tannur for food production and storage. To the south, two rectangular buildings, with rounded corners, were identified, both of them consisted of a main broad-room connected to a central courtyard (368-369), and flanked by subsidiary rooms.

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25 Sellin - Watzinger 1913, fig. 10; Kenyon 1981, 322.

26 In the North-Eastern Trench J. Garstang identified the EB IB/Sultan IIIa2 village in Level VI (Garstang - Droop - Crowfoot 1935, 149-150, 152-153, pls. XXIV,a, XXXVI-XXXVIII; Garstang - Ben-Dor - FitzGerald 1936, 73-74, pls. XXXV-XXXVI; Nigro 2005, 35-41), while K.M. Kenyon brought to light a portion of the village in Squares E III-IV, associated by J.B. Hennessy to Phases Q-N (Hennessy 1967, 6-15; Kenyon 1981, 322-325, pls. 313b-314; Nigro 2005, 122-124).

27 Nigro 2008, 650-652.

28 Garstang - Droop - Crowfoot 1935, 152-153, pl. XXIII; Nigro 2000a, 22-23, figs. 1:15, 1:17-18; 2005, 35-41.

29 Nigro 2005, 35, fig. 3.30, pl. III; 2008, 652; Sala 2011, 10-11.

30 Apsidal buildings are attested to at several EB I sites in Palestine, Jordan and Lebanon (Braun 1989; Ben-Tor 1992, 62-64; Philip 2001, 175-176; Sebag 2005, 226). The relation of these buildings to special finds, such as copper axes recovered in foundation deposits or vessels of Grey Burnished Ware, seems to confirm the theory of those structures as more than simply domestic units (Nigro 2005, 123; 2007, 18; Montanari 2012, 10, 13-14).

31 The EB IB/Sultan IIIa2 dwelling units excavated in the northern quarter may be considered an example of the broad-room houses, with a main broad-room building, connected to subsidiary rooms, with benches along the walls and installations for food production (such as pits, silos, platforms and hearts), and a common open court; the interior of the houses was often divided using cross-walls (Ben-Tor 1992, 64; Sebag 2005, 225).

32 Nigro 2005, figs. 3.34-3.35

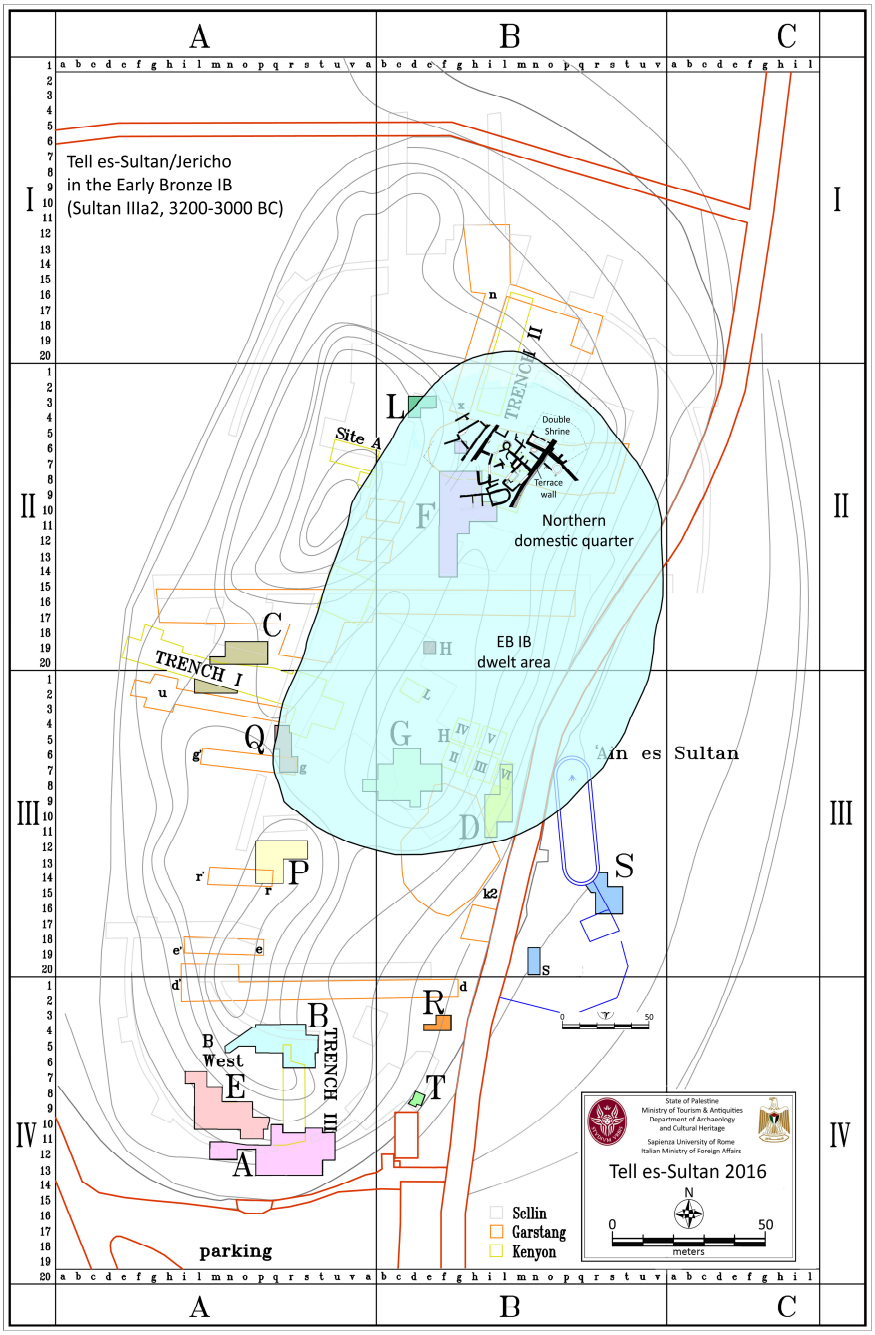

Fig. 4 - Reconstructive map with the estimated size of Tell es-Sultan/Jericho during the Early Bronze IB (Sultan IIIa2, 3200-3000 BC), with the plan of the village excavated in the northern *plateau* (after Nigro 2005, 119, fig. 4.11).

Fig. 5 - The rectangular House 372+374+379 in the EB IB/Sultan IIIa2 village of Tell es-Sultan/Jericho (after Nigro 2005, 38, fig. 3.34).

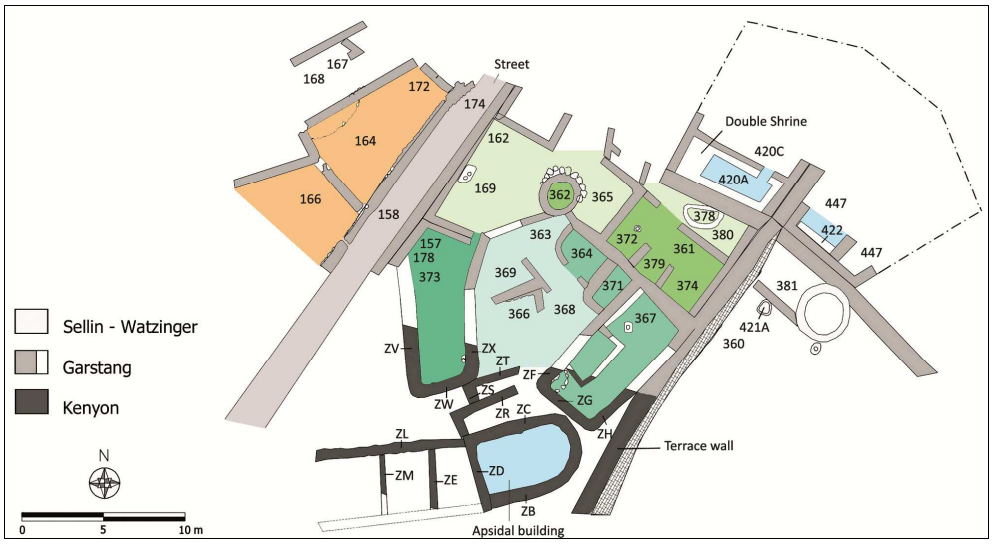

Fig. 6 - Plan of the EB IB/Sultan IIIa2 rural village excavated in Area F (after Nigro 2005, pl. III).

The total living area comprises roughly 10% of the excavated area, while a greater portion of the domestic quarter was devoted to public installations and structures. In the EB IB the living area increased, with main broad-rooms measuring from 22 to 28 m², which may have comprised from 14 to 17 individuals in 4 nuclear families (tab. 3). Based on the estimate of 14/17 individuals per 1,000 m², the population density for the Sultan IIIa2 village of Jericho, extended for about 2 ha, would be ca. 280/340 inhabitants (i.e. 140/160 people per ha).

House	Functional components	Living area	Storage area	Courtyard area	Total living area	Total house area	Number of people
House 164+166	Main broad-room	28 m²	-	-	28 m²	40 m²	4/5 (1 family)
	Subsidiary rooms 168+167	-	12 m²				
House 362+372+379+374	Hut 362	3 m²	-	-	28 m²	128 m²	4/5 (1 family)
	Rectangular units 372+379+374	25 m²	-				
Courtyard area	Court 162+169+365	-	-	44 m²	-		
	Court 380 (slios 378)	-	-	56 m²	-		
House 367 (ZF/ZG/ZH)	Main broad-room	22 m²	-	-	22 m²	30 m²	3 (1 family)
	Subsidiary rooms 364+371		8 m²		-		
House 157+178+373 (ZV/ZX/ZW)	Main broad-room	24 m²	-	-	24 m²	34 m²	3/4 (1 family)
Common courtyard area	Court 363+366+368+369	-	-	10 m²	-		
Total house areas and family sizes					102 m²	232 m²	14/17 (4 families)

Tab. 3 - House areas and family sizes calculated for the northern domestic quarter (Area F) of the EB IB/Sultan IIIa2 village at Tell es-Sultan/Jericho.

3.3. The fortified city of Jericho during the EB II (Sultan IIIb, 3000-2700 BC)

At the beginning of the 3rd millennium BC the town arisen from the rural village at Jericho reached an economic status and an inner complexity of social organization also reflected by the urban layout (fig. 7). The earliest city of Jericho had a rectangular layout, delimited by the erection of a massive city-wall[33]. A public area was enucleated on the central mound overlooking the spring and the oasis, where the main public buildings (the palace and the temple) stood[34], and three main dwelling quarters developed on the northern *plateau* and southern one[35], and on the eastern flank of the Spring Hill[36].

[33] Nigro 2006a, 355-361; 2006b, 4-7; 2010a, 11-38; 2010b, 461-463.
[34] Nigro 2010a, 51-61; 2010b, 465-466.
[35] Nigro 2010a, 75-109; 2010b, 464-465.
[36] Nigro 2010a, 51-61.

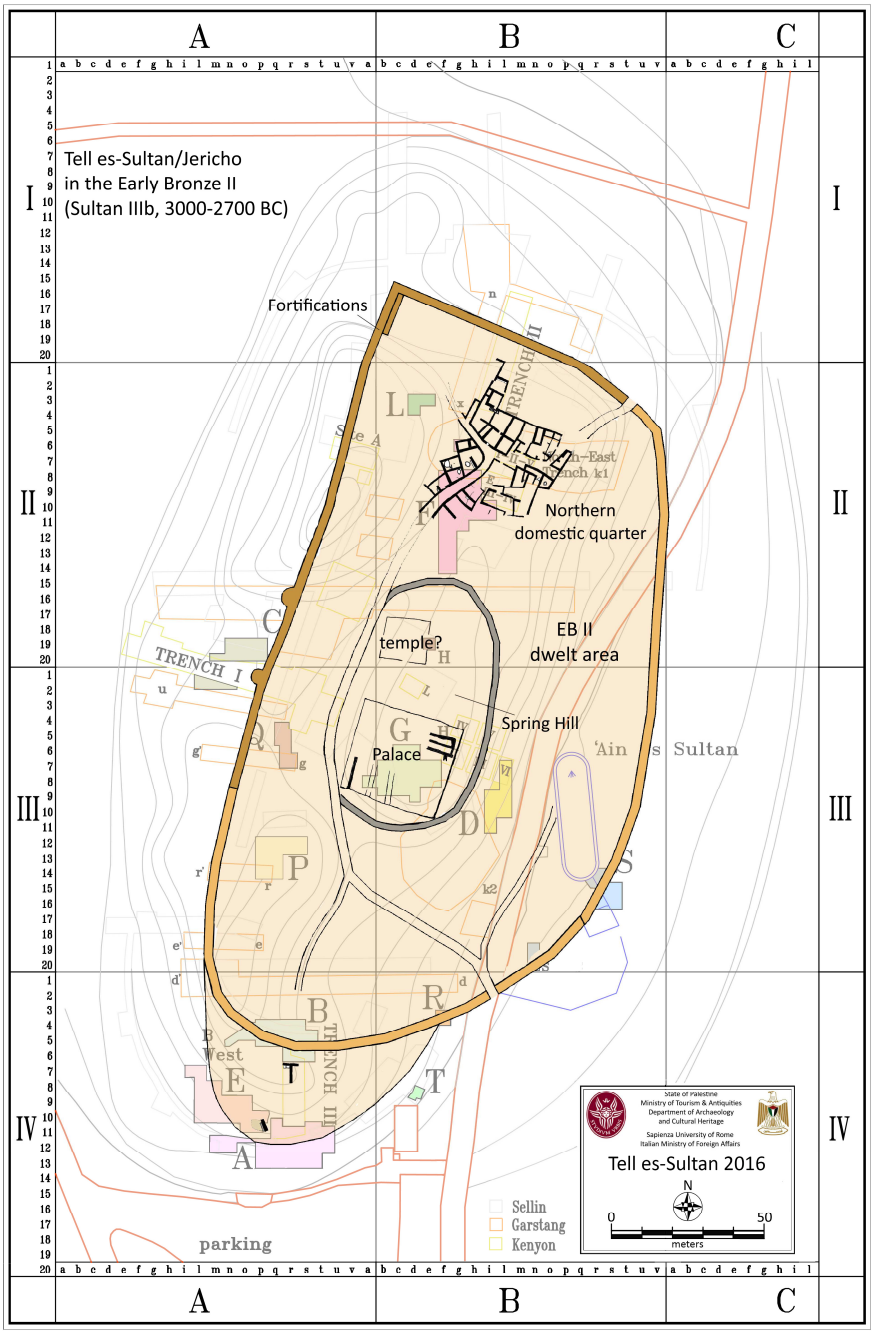

Fig. 7 - Reconstructive map with the estimated size of Tell es-Sultan/Jericho during the Early Bronze II (Sultan IIIb, 3000-2700 BC), with the plan of the village excavated in the northern *plateau* (after Nigro 2016, fig. 6).

Fig. 8 - View of House F looking towards House H, from north (after Nigro 2010a, 87, fig. 4.17).

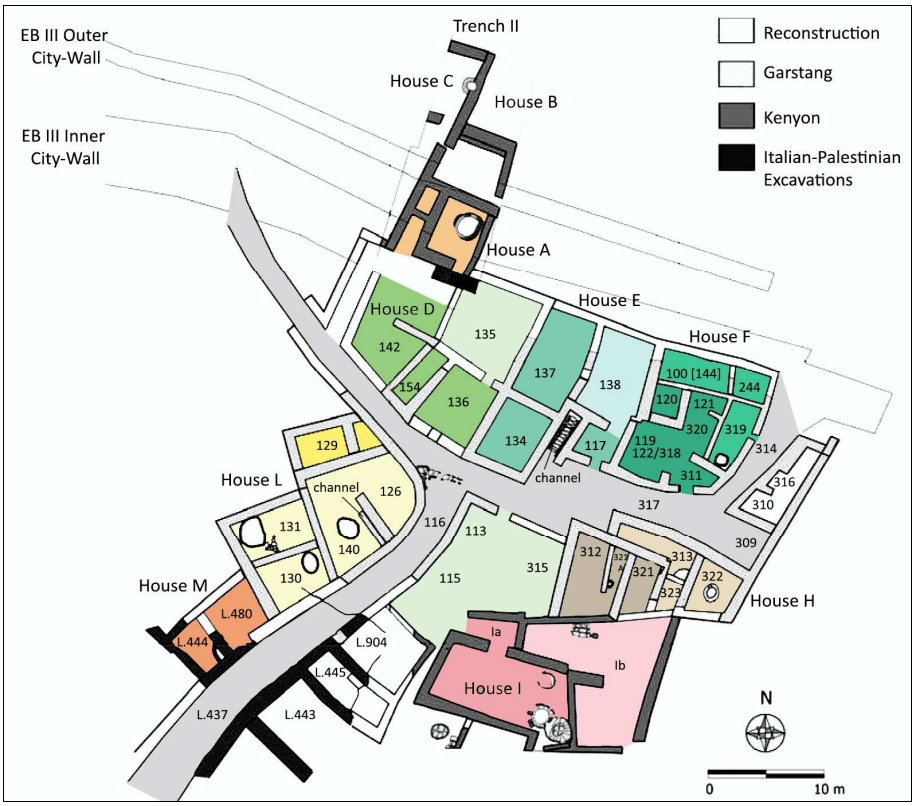

Fig. 9 - Plan of EB II/Sultan IIIb village excavated in Area F (after Nigro 2010a, 104, fig. 4.45).

The northern quarter was extensively investigated, and it is again the most representative for this study[37]. EB II houses at Jericho belonged to different types of domestic structures, as attested to in other EB II sites in Southern Levant[38]. The northern domestic quarter consisted of rectangular dwellings, grown up just over the earliest EB IB houses, articulated in clearly subdivided larger compounds, possibly used by enlarged nuclear families. Domestic compounds were crowded one to the other, in a dense urban layout restricted due to the presence of city-walls. and arranged around the north-west and north-east streets[39].

Over an excavated area of 1,500 m^2, ten different EB II domestic compounds were brought to light[40] (figs. 8-9). House A consisted of a square main room, flanked by two small rectangular rooms, and a small open space to the north[41]. Immediately to the south a compound of three domestic units[42] was identified: House D comprised three rooms (136, 142, 154) and a courtyard (135); House E had a vestibule (117), directly opened on the north-east street (317), a central courtyard (138) and two rectangular rooms (134, 137); House F, with a more articulated plan, included an entrance (311), a main room (119+122/318) from which subsidiary rooms were accessible. A south-eastern compound was flanked on the western and northern sides by the two streets (116, 317), and composed by two wide domestic units (Houses H and I[43]) opened into a common courtyard (113+115/315): House H was a tripartite building (312, 321A, 321), with two small rooms including storage devices (323, 322) and a corridor (313); House I comprised a passage opened into the common yard, a main central rectangular room, flanked by two subsidiary rooms on the northern and

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37 The British Expedition of J. Garstang in 1935-1936 reached EB II strata in the northern quarter and distinguished two main occupational layers, respectively Levels V and IV (Garstang - Droop - Crowfoot 1935, 147-148; Garstang - Ben-Dor - FitzGerald 1936, 73-74, pl. XXVIII), further subdivided in eight phases (L-D) by J.B. Hennessy in relation to Kenyon's excavations in Squares E III-IV (Hennessy 1967, 6-7, 10-14; Kenyon 1981, 309-310, 325-335).

38 The EB II-III Southern Levantine domestic architecture was characterized by rectilinear single-roomed or multi-roomed structures, with internal benches and installations for food processing and storage, generally opened into a common courtyard (Ben-Tor 1992, 62-66; Philip 2001, 176; Sebag 2005, 228-230). Single-room broad-house, or 'Arad house', had a single living room and at least one secondary room; multi-room houses had two or three rooms, with a vestibule or entrance, a main living room and a subsidiary room or internal court. In a dense urban layout, houses could have irregular plans deformed by the urban pressure and a variable number of rooms, from two to five, according to the needs of the inhabitants (possibly extended families).

39 Nigro 2010a, 76-77, 83, figs. 4.33, 4.38.

40 Nigro 2010a, 83-104.

41 Two further structures were brought to light by K.M. Kenyon north of House A in Trench II, namely Houses B and C (Kenyon 1981, 153-161, pls. 251c-253a); however they were only partially excavated, therefore it is not possible to establish the number of individuals who lived there.

42 Nigro 2010a, 84-86, figs. 4.13-4.17.

43 Nigro 2010a, 86-91, figs. 4.18, 4.21-4.22.

eastern sides. On the western side on the north-west street (116) at least two houses were recognized: House L[44] was a large and pluricellular building with a central double courtyard (126+140), a rear rectangular room with a small annex, and two storage rooms (130, 131) on the south-western side; a portion of another unit (House M[45]) was partially excavated, and consisted of two rectangular rooms (L.444, L.480).

House	Functional components	Roofed area	Storage area	Courtyard area	Total living area	Total house area	Number of people
House A	Main room	32 m²	-	-	32 m²	43 m²	4/5 (1 family)
	Northern storage room	-	4 m²				
	Southern storage room	-	7 m²				
House D	Room 136	24 m²	-	-	57 m²	105 m²	7/9 (2 families)
	Room 142	33 m²	-	-			
	Storage room 154	-	7 m²	-			
	Courtyard 135	-	-	41 m²			
House E	Vestibule 117	15 m²	-	-	57 m²	122 m²	7/9 (2 families)
	Room 137	32 m²	-	-			
	Room 134	25 m²	-	-			
	Courtyard 138	-	-	ca. 50 m²			
House F	Entrance 311	8 m²	-	-	50 m²	89 m²	6/8 (2 families)
	Main room 119+122/318	50 m²	-				
	Subsidiary rooms 1120-121-100-244-319	-	31 m²				
House H	Main rooms 312+321A+321	45 m²	-		45 m²	74 m²	4/5 (2 families)
	Storerooms 322+323	-	18 m²				
	Corridor 313	11 m²	-				
Courtyard	Court between H-I	-	-	ca. 130 m²	-	130 m²	-
House I	Main central room	75 m²	-		75 m²	183 m²	7/10 (2 families)
	Entrance Ia	8 m²	-				
	Subsidiary room Ib	-	100 m²				
House L	Room 129	10 m²	-	-	10 m²	135 m²	2 (1 family)
	Storeroom 130+131	-	45 m²	-			
	Double court 126+140	-	-	80 m²			
House M	Rooms 444+480	22 m²	-	-	22 m²	22 m²	3 (1 family)
Total house areas and family sizes					712 m²	1,035 m²	40/51 (13 families)

Tab. 4 - EB II/Sultan IIIb Tell es-Sultan/Jericho house areas and family sizes calculated for the northern domestic quarter (Area F).

[44] Nigro 2010a, 93-94, figs. 4.33-4.37.
[45] Nigro 2010a, 96, figs. 4.38-4.40.

The total living area comprises roughly 47% of the excavated area, where 40/51 individuals could live within 13 nuclear families (tab. 4). For an accurate population estimate of the EB II city, which also comprises extended areas for public buildings, equally important are the unused spaces, such as city-walls, streets, open and public areas with a lower population density, which have been subtracted by the total site extent, corresponding to ca. 3 ha[46]. Therefore, based on the estimate of 40/51 individuals per 1,500 m^2, the population lived in the residential quarters (ca. 2 ha) of the EB II fortified city of Jericho would be ca. 530/680 inhabitants (i.e. 265/340 people per ha).

3.4. The fortified city of Jericho during the EB III (Sultan IIIc, 2700-2300 BC)

A violent earthquake destroyed the EB II city[47], which was promptly reconstructed in the successive phase. During the EB III/Sultan IIIc period, the general urban layout underwent significant changes: the defensive system was rebuilt as a composite double city-wall, public buildings on the top of the Spring Hill were widened[48], and the northern domestic quarter was fully reconstructed[49] (fig. 10). The EB III/Sultan IIIc dwellings in the northern *plateau* were slightly reduced in size due to the double city-walls fortification which restricted the living area. In this period urban density was so great that domestic units were placed side by side, with common walls, without courts and the streets used as an extension of the houses[50] (fig. 11).

The EB III northern domestic quarter was excavated for an area of 1,500 m^2, and fourteen domestic units were identified[51] (fig. 12). The two streets of the previous period were replaced by a single street[52] (L.307), houses grew up on both sides of the street, very close to each other, and were characterized by irregular plans depending on the family needs, economic status, skills of the planner and builder. Three major compounds can be distinguished: north, east and west of the street.

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46 During the EB II the public area on the Spring Hill had an extension of ca. 4,000 m^2, while the remaining unused spaces (ca. 6000 m^2) were occupied by fortifications, gates and streets.

47 Nigro 2014b, 72.

48 The EB III palace on the Spring Hill period reached an extension of ca. 6,000 m^2.

49 Nigro 2006a, 361-375; 2006b, 8-22; 2014b, 73-77; 2016, 9-12; 2017, 159-161.

50 During EB III domestic architecture was often conditioned by an increased urban pressure attested to in the most important Southern Levantine fortified centres (Sebag 2005, 229-230). See also fn. 37.

51 EB III domestic structures on the northern *plateau* were partially excavated by the Austro-German Expedition and related to *Kanaanitische Epoche* (Sellin - Watzinger 1913, 36-38, pl. II). J. Garstang dug a large portion of the EB III quarter to the north-east, and associated these remains to Level III (Garstang - Droop - Crowfoot 1935, 152-154, pl. XXIII). K.M. Kenyon investigated another portion of the quarter in Squares E III-IV (Kenyon 1981, 325-338), and EB III strata were associated to Phases C-A (Hennessy 1967). Finally, the Italian-Palestinian Expedition brought to light the southernmost portion of the quarter in Area F (Nigro 2000a; Nigro - Taha 2009, 740-741).

52 Nigro 2000a, 22-23, figs. 1:17-1:18.

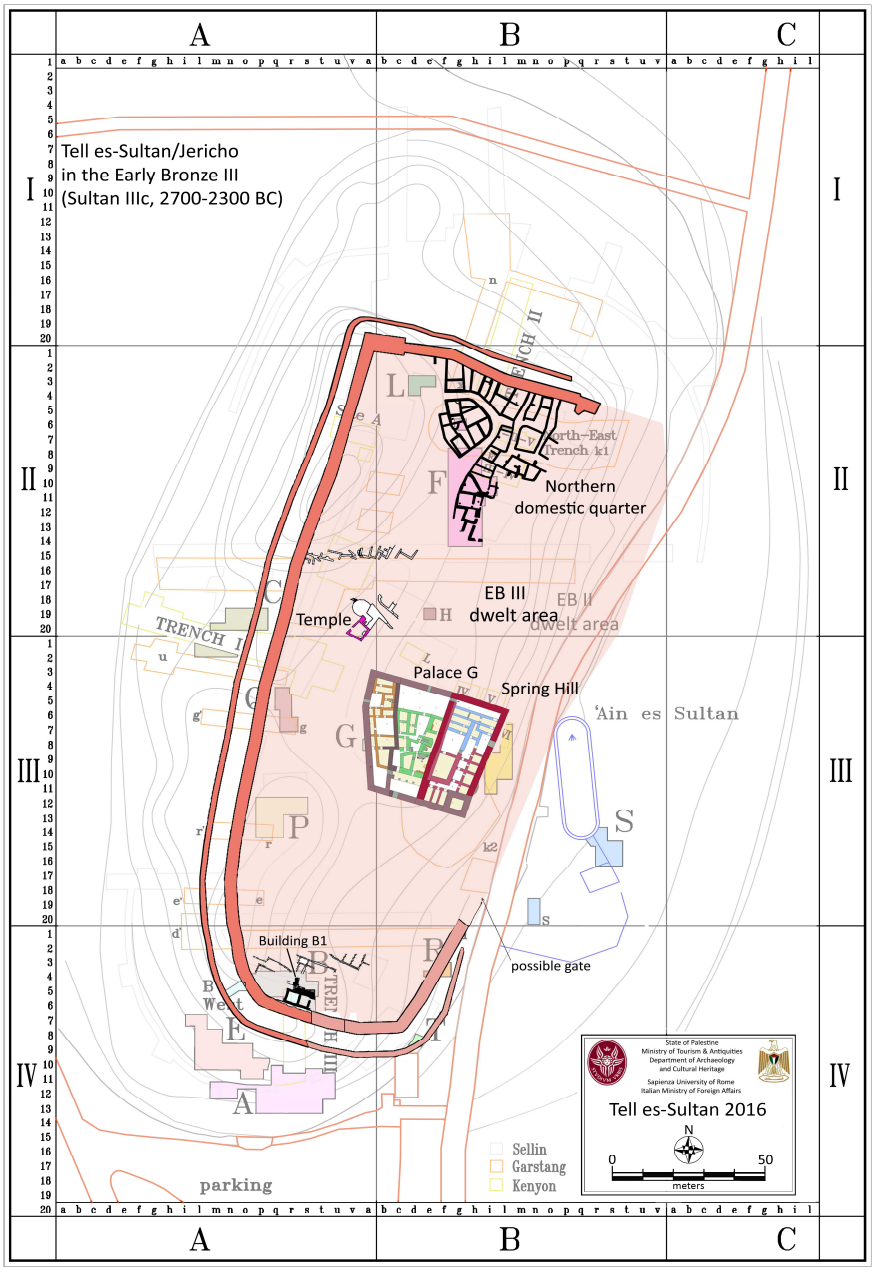

Fig. 10 - Reconstructive map with the estimated size of Tell es-Sultan/Jericho during the Early Bronze III (Sultan IIIc, 3000-2700 BC), with the plan of the village excavated in the northern *plateau* (after Nigro 2016, fig. 8).

Fig. 11 - General view of House L.303 excavated by the Italian-Palestinian Expedition in Area F, from south-east.

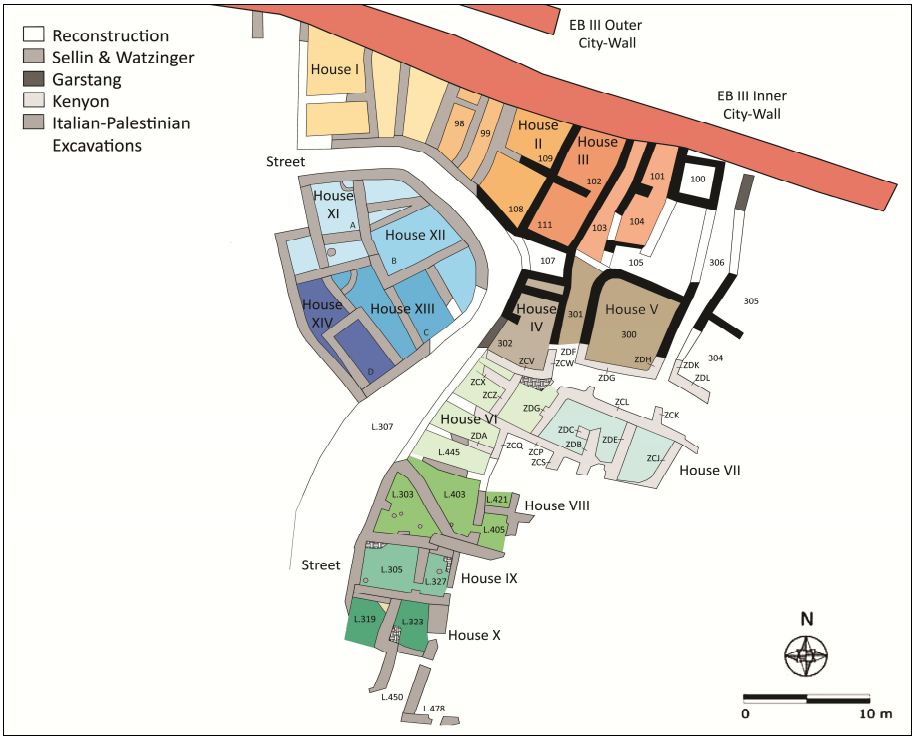

Fig. 12 - Plan of EB III/Sultan IIIc village excavated in Area F.

House	Functional components	Roofed area	Storage area	Courtyard area	Total living area	Total house area	Number of people
House I	Northern main room	26.5 m²	-	-	40 m²	66 m²	5/6 (1 family)
	Southern main room	13.5 m²	-				
	Western storeroom	-	11 m²				
	Eastern storeroom	-	15 m²				
House II	Room 109	16 m²	-	-	36 m²	50 m²	5/6 (1 family)
	Room 108	20 m²	-				
	Storeroom 99	-	6 m²				
	Storeroom 98	-	8 m²				
House III	Room 102	18 m²	-	-	32 m²	66 m²	4/5 (1 family)
	Room 111	14 m²	-				
	Storeroom 103	-	14 m²				
	Storeroom 101+104	-	20 m²				
House IV	Vestibule	3 m²	-	-	20 m²	20 m²	3 (1 family)
	Main room 302	17 m²	-				
House V	Main room 300	42 m²	-	-	42 m²	58 m²	6/7 (1 family)
	Storeroom/corridor 301	-	16 m²				
House VI	Vestibule	8 m²	-	-	20 m²	58 m²	3 (1 family)
	Main room	12 m²	-				
	Northern storeroom	-	18 m²				
	Storeroom L.445	-	20 m²				
House VII	Vestibule	12 m²	-	-	32 m²	32 m²	4/5 (1 family)
	Main bipartite room	20 m²					
House VIII (L.303)	Vestibule 421+405	10 m²	-	-	77 m²	77 m²	7/10 (2 families)
	Room 403	32 m²					
	Main Room 303	35 m²					
House IX (L.305)	Vestibule 327	10 m²	-	-	30 m²	30 m²	4/5 (1 family)
	Main room 305	20 m²					
House X (L.319)	Vestibule 323	12 m²	-	-	34 m²	34 m²	5/6 (1 family)
	Room 319	22 m²					
House XI	Main room (A)	30 m²	-	-	30 m²	41 m²	4/5 (1 family)
	Storeroom	-	5 m²	-			
	Courtyard	-	-	6 m²			
House XII	Main room (B)	20 m²	-	-	20 m²	36 m²	3 (1 family)
	Courtyard	-		16 m²			
House XIII	Main room (C)	15 m²	-	-	15 m²	29 m²	3 (1 family)
	Courtyard	-		14 m²			
House XIV	Main room (D)	14 m²	-	-	14 m²	28 m²	3 (1 family)
	Courtyard	-		14 m²			
Total house areas and family sizes					557 m²	607 m²	59/70 (15 families)

Tab. 5 - EB III/Sultan IIIc Tell es-Sultan/Jericho house areas and family sizes calculated for the northern domestic quarter (Area F).

The northern compound comprised three domestic units (Houses I-III), leaning to the inner face of the Main Inner City-Wall and showing similar plans: a bipartite building with two main broad-rooms, flanked by two rectangular elongated subsidiary rooms with internal partitions. East of the street, seven houses (IV-X) were distinguished; Houses IV, V, IX (i.e. House L.305[53]) and X (i.e. House L.319[54]) belonged to the general group of the forecourt building, composed by two rooms, usually a main roofed room and a vestibule[55]; House VI consisted of two main broad-rooms, flanked by two elongated rectangular spaces (as in the northern compound); House VII was a tripartite building; House VIII (i.e. House L.303[56]) comprised two triangular rooms (L.303, L.403) (fig. 11), and two rear small annexes (L.405, L.421). The western compound consisted of four houses (XI-XIV), each one composed by a main roughly rectangular room, flanked by one or more subsidiary rooms.

On the basis of the total living area, which comprises roughly 38% of the excavated area, about 52/70 individuals, within 15 nuclear families, lived in the northern quarter of Jericho during the EB III (tab. 5). In the same period public buildings, such as Palace G[57] and Building B1[58], occupied large portions of the site[59]. Extensive archaeological investigations allow to plot an overall map of the EB III fortified city, and according to the analysis of the different functional areas of the city, extended for ca. 3 ha, Jericho was composed approximately of 65% of residential areas, 25% of public buildings, and 10% of unused spaces (city-walls, gates and streets). Therefore, based on the estimate of 59/70 individuals per 1,500 m^2, the population that lived in the residential neighborhoods of the EB III city of Jericho (ca. 2 ha) would be ca. 780/930 inhabitants (i.e. 390/465 people per ha).

4. Concluding remarks

The domestic quarter brought to light on the northern *plateau* of Tell es-Sultan/ancient Jericho (fig. 13) testifies to an occupational continuity during the 3rd millennium BC, with an uninterrupted sequence of reconstruction of the houses throughout the Early Bronze Age I-III (3000-2300 BC). The archaeological contexts of the dwelling areas turned out to be particularly useful in light of a demographic analysis. Drawing on the excavated data from residential contexts of the northern domestic quarter, this study allows to define a preliminary estimate of the population of Jericho during the Early Bronze Age, which gradually grew up as the site developed from the EB IA-B village to the EB II-III fortified city.

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53 Nigro 2000a, 27-29, figs. 1:19, 1:21, 1:23-1:24.

54 Nigro 2000a, 50, figs. 1:28-1:29, 1:31.

55 Ben-Tor 1992, 64-66, figs. 7-10.

56 Nigro 2000a, 40-41, figs. 1:22, 1:25-1:27.

57 Nigro 2006b, 20-22; 2016, 10, figs. 1, 9-10; 2017, 159-161; Nigro *et al.* 2011, 586-592.

58 Nigro 1998, 23-49; 2000b, 121-138; 2006b, 19-20.

59 Within palace and public buildings the ruling elite, their servants, and probably some of the extended families of the city devoted to administrative positions have lived (Chesson 2003, 86).

Population estimate	EB IA Sultan IIIa1	EB IB Sultan IIIa2	EB II Sultan IIIb	EB III Sultan IIIc
Minimum index	260	280	530	780
Maximum index	280	340	680	930

Tab. 6 - Population estimate of Tell es-Sultan/Jericho during the Early Bronze Age I-III.

During EB IA-B Jerichoans lived in curvilinear dwellings, spread in a large urban layout, which usually comprised undifferentiated residential floor area, with open spaces for communal activities, and hosted few small nuclear families. In the following EB II-III urban period, larger and rectilinear dwellings, with multifunctional spaces (storage space, food production spaces, courts), were multiplied and arranged in a dense and well planned urban layout, comprising larger nuclear or extended families.

Data obtained from this preliminary demographic analysis suggest a substantial and progressive growth of the population settled at Tell es-Sultan during the Early Bronze I-III (tab. 6), a trend which is also observed in the architectural, social and economic features of the EBA settlement, and a further evidence of the extraordinary process which involved the site and the community of Jericho in the 3rd millennium BC.

Fig. 13 - General view of the northern *plateau* of Tell es-Sultan with the EB II-III domestic quarter excavated in Area F, from north.

REFERENCES

AMIRAN, R. - ILAN, O.
1996 *Early Arad II: The Chalcolithic and Early Bronze IB Settlements and Early Bronze II Architecture and Planning. Sixth to Eighteenth Seasons of Excavations, 1971-1978, 1980-1984*, Jerusalem 1996.

AMIRAN, R. - PARAN, U. - SHILO, Y. - BROWN, R. - TSAFRIR, Y. - BEN-TOR, A.
1978 *Early Arad. The Chalcolithic Settlement and Early Bronze City I. First-Fifth Seasons of Excavations 1962-1966* (Judean Desert Studies), Jerusalem 1978.

ANFINSET, N.
2006 "The Joint Palestinian-Norwegian Expedition at Tell el-Mafjar", in L. NIGRO - H. TAHA (eds.), *Tell es-Sultan/Jericho in the Context of the Jordan Valley: Site Management, Conservation and Sustainable Development. Proceedings of the International Workshop Held in Ariha 7th - 11th February 2005 by the Palestinian Department of Antiquities and Cultural Heritage - Ministry of Tourism and Antiquities, UNESCO Office - Ramallah, Rome "La Sapienza" University* (Rome «La Sapienza» Studies on the Archaeology of Palestine & Transjordan 2), Rome 2006, pp. 63-82.

ANFINSET, N. - TAHA, H. - YASIN, J. - ZAWAHRA, M.
2011 "Societies in transition: Contextualizing Tell el-Mafjar", in J.L. LOVELL - Y.M. ROWAN (eds.), *Culture, chronology and the Chalcolithic theory and transition*, Oxford 2011, pp. 97-113.

AURENCHE, O.
1981 "Essai de démographie archéologique. L'example des villages du Proche-Orient ancient", in *Paleotient* 7.1 (1981), pp. 93-105.

BEN-TOR, A.
1992 "Early Bronze Age dwellings and installations", in A. KEMPINSKI - R. REICH (eds.), *The Architecture of Ancient Israel. From the Prehistoric to Persian Period*, Jerusalem 1992, pp. 60-67.

BRAUN, E.
1989 "The Problem of the Apsidal House: New Aspects of Early Bronze I Dmestic Architecture in Israel, Jordan, and Lebanon", in *Palestine Exploration Quarterly* 121 (1989), pp. 1-43.

BROSHI, M. - FINKELSTEIN, I.
1992 "The Population of Palestine in Iron Age II", in *Bulletin of the American Schools of Oriental Research* 287 (1992), pp. 47-60.

BROSHI, M. - GOPHNA, R.
1984 "The Settlements and Population of Palestine during the Early Bronze Age II-III", in *Bulletin of the American Schools of Oriental Research* 253 (1984), pp. 41-53.
1986 "Middle Bronze Age II Palestine: Its Settlements and Population", in *Bulletin of the American Schools of Oriental Research* 261 (1986), pp. 73-90.

BROWN, B.
1987 "Population Estimation from Floor Area: A Restudy of 'Naroll's Constant'", in *Cross-Cultural Research* 21.1-4 (1987), pp. 1-49.

CHESSON, M.S.
2003 "Households, Houses, Neighborhoods and Corporate Villages: Modeling the Early Bronze Age as a House Society", in *Journal of Mediterranean Archaeology* 16.1 (2003), pp. 79-102.

D'ANDREA, M. - SALA, M.
2011 "Catalogue of the sites in the Jericho Oasis and surroundings", in L. NIGRO - M. SALA - H. TAHA (eds.), *Archaeological Heritage in the Jericho Oasis. A systematic catalogue of archaeological sites for the sake of their protection and cultural valorization* (Rome «La Sapienza» Studies on the Archaeology of Palestine & Transjordan 7), Rome 2011, pp. 95-169.

FINKELSTEIN, I.
1990 "A Few Notes on Demographic Data from Recent Generations and Ethnoarchaeology", in *Palestine Exploration Quarterly* 122.1 (1990), pp. 47-52.

FISCHER, P. M.
2008 *Tell Abu Kharaz in the Jordan Valley, Volume I: The Early Bronze Age* (Österreichische Akademie der Wissenschaften, Denkschriften der Gesamtakademie, Band XLVIII), Wien 2008.

FOERSTER, G.
1993 "Tulul Abu el-Alayiq. The Chalcolithic Settlement", in E. STERN (ed.), *The New Encyclopedia of Archaeological Excavations in the Holy Land*, Vol. 3, Jerusalem 1993, p. 683.
GARSTANG, J. - BEN-DOR, I. - FITGERALD, G.M.
1936 "Jericho: City and Necropolis (Report for the Sixth and Concluding Season, 1936)", in *Annals of Archaeology and Anthropology* 23 (1936), pp. 67-100.
GARSTANG, J. - DROOP, J.P. - CROWFOOT, J.
1935 "Jericho: City and Necropolis (Fifth Report)", in *Annals of Archaeology and Anthropology* 22 (1936), pp. 143-184.
GARSTANG, J. - GARSTANG, J.B.E.
1948 *The Story of Jericho*, London 1948.
GENZ, H.
2002 *Die frühbronzezeitliche Keramik von* Ḫirbet ez-Zeraqōn (Abhandlungen des Deutschen Palästina-Vereins, Band 27,2), Wiesbaden 2002.
HARRISON, T.P.
1997 "Shifting Patterns of Settlement in the Highlands of Central Jordan during the Early Bronze Age", in *Bulletin of the American Schools of Oriental Research* 306 (1997), pp. 1-37.
2000 "Field D: The Lower Southern Terrace", in L.G. HERR - D.R. CLARK - L.T. GERATY - R.W. YOUNKER - Ø.S. LABIANCA (eds.), *Madaba Plains Project 4: The 1992 Season at Tell al-'Umayri and Subsequent Studies*, Berrien Springs 2000, pp. 95-154.
HENNESSY, J.B.
1967 *The Foreign Relations of Palestine during the Early Bronze Age*, London 1967.
ILAN, O.
2001 "Household archaeology at Arad and 'Ai in the Early Bronze Age II", in S.R. WOLFF (ed.), *Studies in the Archaeology of Israel and Neighboring Lands in Memory of Douglas L. Esse* (Studies in Ancient Oriental Civilization 59/American Schools of Oriental Research 5), Chicago2001, pp., pp. 317-354.
KENYON, K.M.
1981 *Excavations at Jericho. Volume Three: The Architecture and Stratigraphy of the Tell*, London 1981.
KRAMER, C.
1982 *Village Ethnoarchaeology: Rural Iran in Archaeological Perspective*, New York 1982.
LEBLANC, S.
1971 "An Addition to Naroll's Suggested Floor Area and Settlement Population Relationship", in *American Antiquity* 36.2 (1971), pp. 210-211.
MARFOE, L.
1980 "Review of Ruth Amiran Early Arad: The Chalcolithic Settlement and Early Bronze City. Vol. 1. First-Fifth Seasons of Excavations, 1962-1966", in *Journal of Near Eastern Studies* 39.4 (1980), pp. 315-322.
MONTANARI, D.
2012 "Copper axes and double-apses buildings: investigating EB I social interrelations", in *Vicino Oriente* XVI (2012), pp. 1-28.
NAROLL, R.
1962 "Floor area and Settlement Population", in *American Antiquity* 27.4 (1962), pp. 587-589.
NIGRO, L.
1998 "L'Area B. La cinta di mura interna e l'Edificio B1", in N. MARCHETTI - L. NIGRO, *Scavi a Gerico, 1997. Relazione preliminare sulla prima campagna di scavi e prospezioni archeologiche a Tell es-Sultan, Palestina* (Quaderni di Gerico 1), Roma 1998, pp. 23-80.
2000a "Area F. An Early Bronze IIIA residential quarter", in N. MARCHETTI - L. NIGRO, *Excavations at Jericho, 1998. Preliminary Report on the Second Season of Excavations and Surveys at Tell es-Sultan, Palestine* (Quaderni di Gerico 2), Roma 2000, pp. 15-120.
2000b "Architecture and stratigraphy of Building B1", in N. MARCHETTI - L. NIGRO, *Excavations at Jericho, 1998. Preliminary Report on the Second Season of Excavations and Surveys at Tell es-Sultan, Palestine* (Quaderni di Gerico 2), Rome 2000, pp. 121-163.

2005 *Tell es-Sultan/Gerico alle soglie della prima urbanizzazione: il villaggio e la necropoli del Bronzo Antico I (3300-3000 a.C.)* (Rome «La Sapienza» Studies on the Archaeology of Palestine & Transjordan 1), Roma 2005.

2006a "Sulle mura di Gerico. Le fortificazioni di Tell es-Sultan come indicatori della nascita e dello sviluppo della prima città di Gerico nel III millennio a.C.", in F. BAFFI - R. DOLCE - S. MAZZONI - F. PINNOCK (edd.), *Ina Kibrāt Erbetti. Studi di Archeologi orientale dedicati a Paolo Matthiae*, Roma 2006, pp. 349-397.

2006b "Results of the Italian-Palestinian Expedition to Tell es-Sultan: at the Dawn of Urbanization in Palestine", in L. NIGRO - H. TAHA (eds.), *Tell es-Sultan/Jericho in the Context of the Jordan Valley: Site Management, Conservation and Sustainable Development. Proceedings of the International Workshop Held in Ariha 7th - 11th February 2005 by the Palestinian Department of Antiquities and Cultural Heritage - Ministry of Tourism and Antiquities, UNESCO Office - Ramallah, Rome «La Sapienza» University* (Rome «La Sapienza» Studies on the Archaeology of Palestine & Transjordan 2), Rome 2006, pp. 1-40.

2007 "Aside the spring: Byblos and Jericho from village to town in the second half of the 4th millennium BC", in L. NIGRO (ed.), *Byblos and Jericho in the Early Bronze I. Social dynamics and cultural interactions. Proceedings of the International Workshop held in Rome on March 6th 2007 by Rome "La Sapienza" University* (Rome «La Sapienza» Studies on the Archaeology of Palestine & Transjordan 4), Rome 2007, pp. 1-45.

2008 "Tell es-Sultan/Jericho from Village to Town: A Reassessment of the Early Bronze Age I Settlement and Necropolis", in J.M. CÓRDOBA - M. MOLIST - Mª.C. PÉREZ - I. RUBIO - S. MARTÍNEZ (eds.), *Proceedings of the 5th International Congress on the Archaeology of the Ancient Near East (5-8 April 2006),* Volume II, Madrid 2008, pp. 645-662.

2010a *Tell es-Sultan/Jericho in the Early Bronze Age II (3000-2700 BC): the rise of an early Palestinian city. A synthesis of the results of four archaeological expeditions* (Rome «La Sapienza» Studies on the Archaeology of Palestine & Transjordan 5), Rome 2010.

2010b "Tell es-Sultan/Jericho and the Origins of Urbanization in the Lower Jordan Valley: Results of Recent Archaeological Researches", in P. MATTHIAE - F. PINNOCK - L. NIGRO - N. MARCHETTI (eds.), *Proceedings of the 6th International Congress of the Archaeology of the Ancient Near East. Volume 2. Excavations, Surveys and Restorations: Reports in Recent Field Archaeology in the Near East*, Wiesbaden 2010, pp. 459-481.

2011 "Distributive analysis and occupational study in the Jericho Oasis from the Neolithic up the Ottoman Period", in L. NIGRO - M. SALA - H. TAHA (eds.), *Archaeological Heritage in the Jericho Oasis. A systematic catalogue of archaeological sites for the sake of their protection and cultural valorization* (Rome «La Sapienza» Studies on the Archaeology of Palestine & Transjordan 7), Rome 2011, pp. 5-27, 39-54 (maps).

2014a "Aside the Spring: Tell es-Sultan/Ancient Jericho: the Tale of an Early City and Water Control in Ancient Palestine", in T. TVEDTAND - T. OESTIGAARD (eds.), *A History of Water. Series III. Volume 1: Water and Urbanization*, New York 2014, pp. 25-51.

2014b "The Archaeology of Collapse and Resilience: Tell es-Sultan/ancient Jericho as a Case Study", in L. NIGRO (ed.), *Overcoming Catastrophes. Essays on disastrous agents characterization and resilience strategies in pre-classical Southern Levant* (Rome «La Sapienza» Studies on the Archaeology of Palestine and Transjordan 11), Rome 2014, pp. 55-85.

2016 "Tell es-Sultan 2015. A Pilot Project for Archaeology in Palestine", in *Near Eastern Archaeology* 79.1 (2016), pp. 4-17.

2017 "The end of the Early Bronze Age in the Southern Levant. Urban Crisis and Collapse seen from two 3rd Millennium BC-Cities: Tell es-Sultan/Jericho and Khirbet al-Batrawy", in T. CUNNINGHM - J. DRIESSEN (eds.), *Crisis to Collapse. The Archaeology of Social Breakdown* (AEGIS 11). Louvain 2017, pp. 149-172.

NIGRO, L. - CALCAGNILE, L. - YASIN, J. - GALLO, E. - QUARTA, G.

2019 "Jericho and the Chronology of Palestine in the Early Bronze Age: A Radiometric Re-Assessment", in *Radiocarbon* 61.1 (2019), pp. 211-241.

NIGRO, L. - SALA, M. - TAHA, H. - YASSINE, J.
2011 "The Early Bronze Age palace and fortifications at Tell es-Sultan/Jericho. The 6th - 7th seasons (2010-2011) by Rome "La Sapienza" University and the Palestinian MOTA-DACH", in *Scienze dell'Antichità* 17 (2011), pp. 571-597.

NIGRO, L. - TAHA, H.
2009 "Renewed excavations and restorations at Tell es-Sultan/ancient Jericho. Fifth season – March-April 2009", in *Scienze dell'Antichità* 15 (2009), pp. 731-744.

PHILIP, G.
2001 "The Early Bronze Age I-III", in B. MACDONALD - R. ADAMS - P. BIENKOWSKI (eds.), *The Archaeology of Jordan*, Sheffield 2001, pp. 163-232.

SALA, M.
2005 "Il Sacello 420 ("Babylonian Shrine"): luogo di culto di un quartiere abitativo. Struttura e funzioni", in L. NIGRO, *Tell es-Sultan/Gerico alle soglie della prima urbanizzazione: il villaggio e la necropoli del Bronzo Antico I (3300-3000 a.C.)* (Rome «La Sapienza» Studies on the Archaeology of Palestine & Transjordan 1), Roma 2005, pp. 42-47.
2011 "Sanctuaries, temples and cult places in Early Bronze I Southern Levant", in *Vicino Oriente & Medio Oriente* XV (2011), pp. 1-32.

SEBAG, D.
2005 "The Early Bronze Age Dwellings in the Southern Levant", in *Bulletin du Centre de recherche français à Jerusalem* 16 (2005), pp. 222-235.

SELLIN, E. - WATZINGER, C.
1913 *Jericho. Die Ergebnisse der Ausgrabungen* (Wissenschaftliche Veröffentlichung der Deutschen Orient-Gesellschaft 22), Leipzig 1913.

STAGER, L.E.
1985 "The Archaeology of the Family in Ancient Israel", in *Bulletin of the American Schools of Oriental Research* 260 (1985), pp. 1-35.

SWINNEN, I.M.
2009 "The Iron Age I Settlement and Its Residential Houses at al-Lahun in Moab, Jordan", in *Bulletin of the American Schools of Oriental Research* 354 (2009), pp. 29-53.

TAHA, H. - ANFINSET, N. - YASINE, J. - ZAWAHIRA, M.
2004 "Preliminary report on the first season of the Palestinian-Norwegian excavation at Tell el-Mafjar 2002, Jericho", in *Orient Express* 2004.2, pp. 40-44.

WAGNER, N.E.
1972 "Early Bronze Age Houses at Ai (et-Tell)", in *Palestine Exploration Quarterly* 104 (1972), pp. 5-25.

ZORN, J.R.
1994 "Estimating the Population Size of Ancient Settlements: Methods, Problems, Solutions, and a Case Study", in *Bulletin of the American Schools of Oriental Research* 295 (1994), pp. 31-48.

[ROSAPAT 13]

CONCEPTUALIZING URBAN EXPERIENCES

Tell es-Sultan and Tall al-Ḥammām Early Bronze cities across the Jordan

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