'Atiqot 86, 2016

Textiles, Cordage and Fleece from 'En 'Avrona

Orit Shamir

Between 1973 and 1990, five seasons of excavations were carried out at 'En 'Avrona in the 'Arava under the direction of Yosef Porath (see Porath, this volume) and Uzi Avner (Avner and Magness 1998). Fragments of textile, cordage and fleece, in a very poor state of preservation, were retrieved from Building B. Most of the material was found in an archaeological context dated to the Early Islamic period (seventh–ninth centuries CE). Two threads, which originated in a collapse above one of the building's floors (L60, B251; see Porath, this volume: Plan 6), were dated by Carbon-14 to the Ottoman period (1520–1666 CE; RT-2543—Segal and Carmi 2004:146).[1]

Textiles (Table 1)

Twenty-two textile fragments from the Early Islamic period were studied. They are made of wool, linen and cotton.

Wool (N = 14)
Fourteen wool fragments were found: seven are tabby S-spun; three are Z-spun, weft faced; one (No. 2005–9023) is twill (Fig. 1), S-spun warp and Z-spun weft, decorated with a one-centimeter-wide band of undyed light brown and undyed brown; one (No. 599458) is Z2S weft faced; and two (Nos. 599447, 599441) have S2Z warp threads—one has a S-spun weft and the other, a Z-spun weft. The number of threads per centimeter varies in the warp from 5 to 12, and in the weft, from 5 to 20. Most of the fragments are undyed cream. Two are undyed brown fibers, two are carbonized and three are of crude fabrics.

Linen (N = 6)
The linen textiles are made of S-spun yarn, woven in tabby weave, with slightly more warp threads than weft threads; all are very delicate. The number of threads per centimeter varies in the warp from 12 to 22, and in the weft, from 10 to 22. One fragment (No. 2005–9015; Fig. 2) is a warp-faced tabby. Five fragments are carbonized, one (No. 819475) is undyed gray and has a rolled hem, which is sewn with linen S2Z (S-spun, Z plied) hemming stitches. Another fragment (No. 599445) is folded into two.

Cotton (N = 2)
Only two cotton textiles were found. One (No. 819480) is Z-spun in both directions, warp faced and dyed blue. Its hem is preserved and sewn with red, Z-spun running stitches (Fig. 3).

Fig. 1. Wool, decorated with a brown band, twill (No. 2005–9023).

Table 1. ‘En ‘Anvrona Textiles (for abbreviations, see Appendix I)

IAA No. (Fig. No.)	Loc.	Basket No.	Material	CON	Size		SD		ST		TPC		WT	D	Color		Edge	S	Comments
					WA	WE	WA	WE	WA	WE	WA	WE			WA	WE			
819481	4	4	W	M	1.5	1.4	S	S	T	L	6	13	T	D	UC	UC			
819480 (Fig. 3)	4	36	C	P	2.0	5.0	Z	Z	T	T	25	11	WA.F	D	FR, BL	FR			Hem sewn with red, Z-spun running stitches
819475	4	42	L	M	7.0	1.2	S	S	M	M	14	10	T	D	UGR	UGR	RH	+	Sewing: S2Z, hemming.
599452	4	43	W	M	1.2	1.0	S	S	T	L	11	20	T	D	UC	UC			
599462	21	19	W	M	1.8	1.7	S	S	T	L	5	9	T	D	UC	UC			
819473	21	20	W	M	3.7	1.5	Z	Z	T	L	6	16	WE.F	D	UC	UC			
819502	21	21	W	M	2.8	1.3	S	S	T	T	9	16	T	D	UC	UC			
599455	21	22	L	M	4.0	3.0	S	S	T	M	12	22	T	D	Carbonized	Carbonized			
819477	21	23	W	P	4.5	1.5	Z	Z	T	L	7	20	WE.F	D	UC	UC			Few more pieces
2005-9015 (Fig. 2)	21	32	L	M	13.5	9.0	S	S	M	M	22	10	WA.F	D	Carbonized	Carbonized			
599439	21	33/1	W	P	9.0	3.5	Z	Z	T	L	8	20	WE.F	D	UC	UC			Eastern wall, south to the entrance
599440	21	33/2	W	P	2.8	2.0	S	S	T	L	6	11	T	D	UC	UC			Many more pieces
599431	21	34	W	M	2.0	2.0	S	S	T	M	6	12	WE.F	D	UC	UC			
599447	21	38/1	W	P	4.0	4.5	S2Z	Z	T	T	2	6	WE.F	D	UC, Pig. B	UC, Pig. B			More small pieces, crude
599441	21	38/2	W	P	8.7	8.4	S2Z	S	T	M	2	5	WE.F	D	UC + Pig. B	UC	PS		Crude
599458	30	2	W	M	2.2	2.0	Z2S	Z2S	M	T	3	10	WE.F	D	UC	UC			
819525	32	101/1	W	M	3.4	2.6	S	S	M	M	12	18	T	M	Carbonized	Carbonized			
	32	101/2	L	M	5.0	3.5	S	S	M	M	22	13	T	D	Carbonized	Carbonized			
599445	32	101/3	L	P	3.0	3.0	S	S	M	M	18	13	T	D	Carbonized	Carbonized			Folded into two; few more pieces, one stuck to a piece of wood
	96	1	L	M	1.6	0.7	S	S	M	M	16	11	T	D	Carbonized	Carbonized			
2005-9023 (Fig. 1)	104	1	W	G	8.5	11.0	S	Z	T	M	7	5	TWILL	D	UC	UC			Decorated with a band: ULB, B, 1 cm; crude
2005-9022	100	207/2	C	M	9.5	2.5	Z	S	M	M	24	19	T	D	BL	BL		+	Another piece 5.5 × 5.0 cm; sewing: red textile, Z, hem, running stitch

CON = condition; SD = spinning direction; ST = spinning tightness; TPC = threads per cm; WT = weaving technique; D = density; S = sewing; WA = warp; WE = weft

Fig. 2. Linen, warp-faced tabby, carbonized (No. 2005–9015).

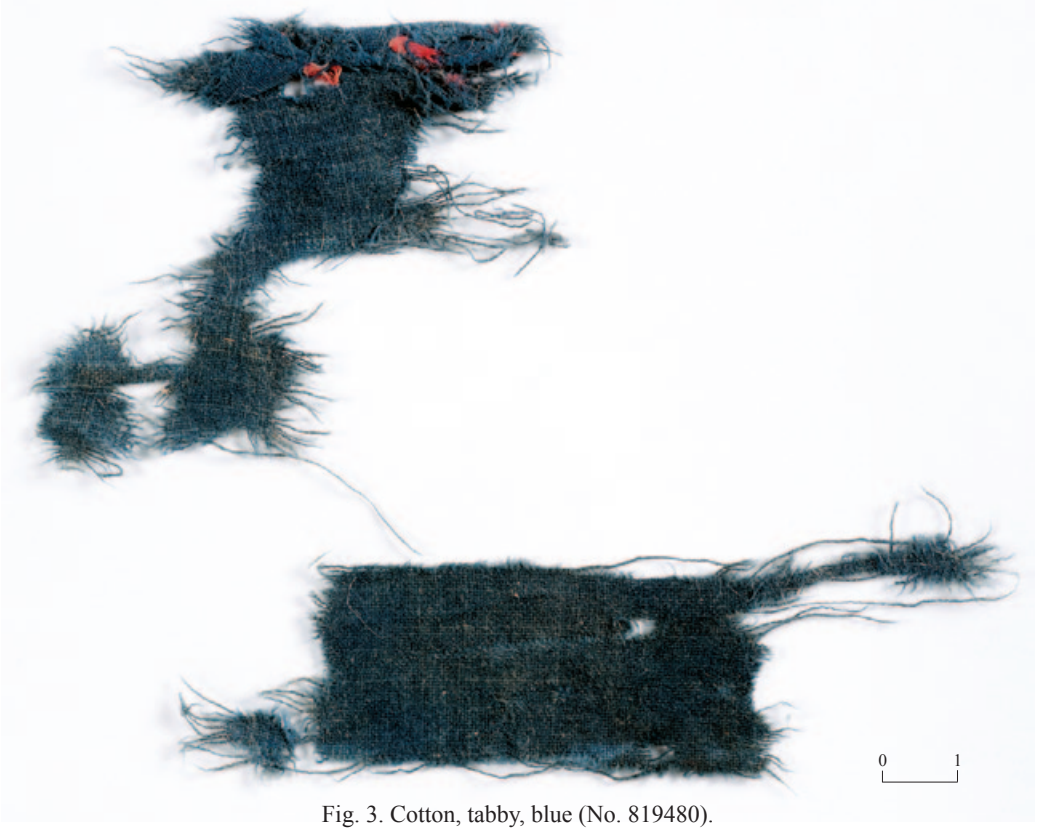

Fig. 3. Cotton, tabby, blue (No. 819480).

0 1

Fig. 4. Thick thread of goat hair fibers (No. 2005–2019).

0 1

Fig. 5. Thick thread of wool and goat hair fibers mixed together (No. 2005–9021).

The other fragment is tabby, with Z-spun faded red-and-blue warp threads and S-spun red weft threads. The number of threads per centimeter varies in the warp from 24 to 25, and in the weft, from 11 to 19.

0 1

Fig. 6. Date palm leaves knotted around leather (No. 2005–9017).

CORDAGE (Tables 2, 3)

Twenty-one fragments of cordage were found at the site. The term "cordage" is used here to indicate items, such as threads, cords, strings, ropes or cables, the longest of which is 10 cm long. The diameter of the cords varies between 5 and 18 mm. Most of the assemblage comprises threads, which are made of cotton, wool, goat hair (Fig. 4), mixed wool and goat hair fibers (Fig. 5) or date palm (Fig. 6). Only four threads are dyed blue or green. There are many variations of twist direction: Z, S, Z2S, S2Z, Z2S4Z and one plait is made of three 5S2Z threads. Most fragments are short, indicating massive use. Only one (No. 2005–9017; Fig. 6) has a knot.

The thin threads (max. diam. 2 mm) were probably used for sewing or mending. The three date palm cords and five thick cords (min. diam. 25 mm) were apparently used for tying.

Two S-spun threads were dated to the Ottoman period based on Carbon-14 analysis (see n. 1): one (L60, B251/1b) is made of blue cotton and the other (L60, B251/1c), of linen (Table 2).

0 1

Fig. 7. Wool fleece, Ottoman period (No. 2005–9016).

FLEECE (Table 4)

Twenty-five fragments of fleece were collected; one (No. 2005–9020) is still connected to leather. Three fleece fragments from L60 were dated by Carbon-14 to the Ottoman period. Two fragments are made of wool and one, of goat hair (Fig. 7).

Table 2. ‘En ‘Avrona Cordage (for abbreviations, see Appendix I)

IAA No. (Fig. No.)	Loc.	Basket No.	Material	SD	Length (cm)	Diam. (mm)	TW	K	Color	Comments
599435	4	2	W	3(5S2Z)	8.0	18	-			Plait; three cords made of 5S2Z threads
819549	4	28	H	Z2S	3.0	10	-		Pig. B	
819476	4	31	W	S	10.0	3	-		G	
2005-9021 (Fig. 5)	4	32/1	W+H	S2Z	8.5	20	20			
819551	4	32/2	H	S2Z	5.0	25	15		Pig. B	
599449	4	32/3	W+H	S2Z	6.0	5	?			
	4	37	H	S2Z	6.0	20	?		Pig. B	
599446	4	38	W	Z2S	3.0, 4.0, 5.0	30	30			
819553	4	44	W	S	5.0	2	-			
	4	49	H	S2Z	3.0	15	18		Pig. B	
599442	21	17	W	S2Z	5.5	35	20			
819555	21	36	W	S2Z4Z	10.0	45				
819550	30	3	P	Z2S	6.0	4	15			
	30	4	C	Z					BL	
	60	251/1b	C	S					BL	Very small fragments
	60	251/1c	L	S						Very small fragments
2005-2019 (Fig. 4)	82	1	H	S2Z	9.5	15	14		Pig. DB	
599456	82	2	W	Z2S	5.0	20	35		UC, UB	Each Z is another color
2005-9017 (Fig. 6)	82	4	P	-	8.0	-	-	+		Leaves knotted around leather fragment
	96	2	P	Z	5.0	30	-			
	100	207/1a	C	Z					BL	Very small fragments

SD = spinning direction; TW = twists per 10 cm ; K = knots

Table 3. Cordage: Materials and Spin Direction

Material	Spin Direction	N
Wool and goat hair	S2Z	2 (Fig. 5)
Wool	S(2), 5S2Z(1), Z2S(2), S2Z (1), S2Z4Z(1)	7
Goat hair	S2Z(4), Z2S(1)	5
Linen	S	1
Cotton	Z(2), S(1)	3
Date palm	Z2S(1), Z(1)	3

Table 4. ‘En ‘Avrona Fleece
(for abbreviations, see Appendix I)

IAA No. (Fig. No.)	Loc.	Basket No.	Material	Color
599433	4	1	W, H, C	UC, pig. B, BL
599451	4	3	W	UC
	4	29	W?	UB
	4	30	W, H	UC, pig. B
	4	33	W, C	
819504	4	47	W	UC
	21	17	W	UC
819549	21	18	C	BL
599450	21	25	W	UC
819503	21	26	W	UC
599453	21	27	W	UC
599454	21	28	W	UC
599459	21	29	W	UC
819530	21	30	W	UC
819544	21	35	H	pig. B
	21	38/1	C	
	21	38/2	W	UC
599434	26	1	C	
	30	4	W, H	UC, pig. B
2005-9016 (Fig. 7)	60	235	W	UC
	60	251/1a	H	pig. B
2005-9020	60	251	W	UC
819538	82	3	W, H	UC, pig. B
	96	3	H	pig. B
2005-9018	100	207/1b	W	UC

DISCUSSION AND SUMMARY

The cotton and linen textiles, and probably most of the woolen textiles, were used for clothing. The crude woolen textiles (Nos. 2005–9023, 599447, 599441; Table 1) were apparently used as sacks. The textiles are all variations of tabby, except for one (No. 2005–9023), which is twill. Most of the textiles were apparently locally made, with the exception of cotton textiles, which were most likely imported from Yemen or India (Z-spun; Baginski and Shamir 1995), or Nubia (S-spun; Thurman and Williams 1979; Shamir 2015).

Cotton textiles were found in Early Islamic sites in Israel, e.g., ‘En Marzev (Shamir, this volume) and Naḥal ‘Omer (Baginski and Shamir 1995), but are absent from contemporary sites, such as Naḥal ‘Amram (Baginski and Cottier-Angeli, unpublished report), Naḥal Shaḥaq (Shamir 1995) and Yoṭvata (Shamir 2005).

No goat-hair textiles were found at the site. Few were recovered from other Early Islamic sites, such as ‘En Marzev (Shamir, this volume), Naḥal ‘Omer (Baginski and Shamir 1995), Naḥal Shaḥaq (Shamir 1995) and Yoṭvata (Shamir 2005). Goat-hair cords do appear at the site.

The ratio between the number of wool textiles (n = 14) and the linen fragments (n = 6) at the site is comparable with the findings from other sites dating to the Early Islamic period in the area, where wool is more dominant than linen, with the exception of Naḥal ‘Omer. The spin direction of wool and linen is mostly S. One of the cotton fragments is Z-spun, as are most cottons of this period discovered in the region, e.g., at ‘En Marzev (Shamir, this volume; see also Baginski and Shamir 1995). Except for one (No. 2005–9023), all the textiles at ‘En ‘Avrona are woven in tabby weave, in accordance with textile finds from other sites in Israel.

Generally, the textiles of ‘En ‘Avrona resemble those from Naḥal Shaḥaq. Their simplicity attests that the economic conditions at ‘En ‘Avrona were the same as at Naḥal Shaḥaq. This is in contrast with contemporary textile finds from Naḥal ‘Omer (Shamir 1992; Baginski and Shamir 1995), Egypt (Marzouk 1955) and Iran (Ackerman 1938). A possible explanation can be that the inhabitants of ‘En ‘Avrona took their goods with them.

The large quantity of fleece probably indicates that weaving took place at the site, although no whorls were found; they were probably made of wood, as at Naḥal ‘Omer (Baginski and Shamir 1995).

APPENDIX I. ABBREVIATIONS USED IN TABLES

Material: W = wool; L = linen; C = cotton
Condition: G = good; M = medium; P = poor
Color: B=brown; BL=blue; C=cream; G=green; GR = gray; FR = faded red ; Pig. = pigmented; U = undyed + unpigmented; D = dark
Density of Weaving: T = tight; M = medium
Edge: RH = rolled hem; PS = plain salvage
Spinning Tightness: L = loose; M = medium; T = tight
Weaving Technique: BAL = balanced tabby; T = tabby

NOTE

[1] The finds were photographed by Clara Amit. Carbon-14 analysis was conducted by Prof. Israel Carmi and Dror Segal, on behalf of the Weizmann Institute of Science, Reḥovot (see Segal and Carmi 2004).

REFERENCES

Ackerman P. 1938. Textiles through the Sāsānian Period. In A.U. Pope and P. Ackerman eds. *A Survey of Persian Art from Prehistoric Times to the Present* I: *Pre-Achaemenid, Achaemenid, Parthian and Sāsānian Periods*. London–New York. Pp. 681–715.

Avner U. and Magness G. 1998. Early Islamic Settlement in the Southern Negev. *BASOR* 310:39–57.

Baginski A. and Shamir O. 1995. Early Islamic Textiles, Basketry and Cordage from Naḥal ‘Omer. *‘Atiqot* 26:21–42.

Marzouk M. 1955. *History of Textile Industry in Alexandria, 331 B.C–1517 A.D*. Alexandria.

Porath Y. This volume. Tunnel-Well (*Qanat*) Systems and Settlements from the Early Islamic Period in the ‘Arava.

Segal D. and Carmi I. 2004. Reḥovot Radiocarbon Date List VI. *‘Atiqot* 48:123–148.

Shamir O. 1992. Textiles Found along the Spice Route from the Roman Period until the Early Islamic Period in Israel. *Archaeological Textiles Newsletter* 14:6–8.

Shamir O. 1995. Textiles from the Naḥal Shaḥaq Site. *‘Atiqot* 26:43–46.

Shamir O. 2005. *Textiles in the Land of Israel from the Roman Period till the Early Islamic Period in the Light of the Archaeological Finds*. Ph.D. diss. The Hebrew University. Jerusalem.

Shamir O. 2015. Egyptian and Nubian textiles from Qasr el-Yahud, 9th century AD. In A. De Moor, C. Fluck and P. Linscheid eds. *Proceedings of the 8th Conference of the Research Group “Textiles from the Nile Valley” (4–6 October 2013, Antwerp)*. Lannoo, Tielt (Belgium). Pp. 48–60.

Shamir O. This volume. Textiles and Fleece from ‘En Marzev.

Thurman C.C.M. and Williams B. 1979. *Ancient Textiles from Nubia*. Chicago.