# Textile tools from Tel Kabri, Israel

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# Tools, Textiles and Contexts

*We dedicate this book to Betchen Barber,*
*the pioneer of the study of Aegean Bronze Age textiles.*

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*Front cover: clockwise: MM II Quartier Mu, Malia, Crete, map (after Poursat 1996, pl. 81), spindle whorls from Phaistos, Crete (courtesy of P. Militello), Khania, Crete, Late Bronze Age ribbon, reconstructed loom weights in TTTC experiments.*
*Back cover: Splicing (drawing: Annika Jeppsson)*

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# Chapter 6.16

# Textile tools from Tel Kabri, Israel

*Assaf Yasur-Landau, Nurith Goshen, Eva Andersson Strand, Marie-Louise Nosch and Joanne Cutler*

Tel Kabri is located in the western Galilee region of modern Israel. Excavations were initially conducted by Aharon Kempinski and Wolf-Dietrich Niemeier from 1986–1993 and renewed by Eric Cline and Assaf Yasur-Landau in 2005 (Kempinski 2002; Cline and Yasur-Landau 2007; Yasur-Landau *et al.* 2008). During the Middle Bronze Age, Kabri was the centre of a Canaanite polity, ruling the northern part of the Acco plain. At the time, Kabri had economic and cultural connections with Egypt, Cyprus, and the Aegean. It is one of only four sites in the Eastern Mediterranean to have Bronze Age Aegean paintings adorning a palatial structure (Niemeier and Niemeier 2000).

A total of 90 textile tools from Tel Kabri are recorded in the TTTC database. They represent available textile tools from the Kempinski and Niemeier excavations published by Oren (2002). Unfortunately, not all the textile tools from the old excavations were located in the Israel Antiquities authority storerooms and so this chapter will refer only to objects available at the time of the data entry. Of the 90 textile tools, 67 tools are dated to the MB II period, and mostly belong to the latest phase of the palace (Kempinski Phase 3c, our Phase DWIII). These include four spindle whorls, 62 loom weights and one needle, while the remaining 23 tools have a wide range of dates, from the Late Neolithic through to the Ottoman period. This analysis will focus on the MB II tools from the palace area. Additional tools found in the renewed excavations, directed by Eric H. Cline and Assaf Yasur-Landau are discussed in Goshen, Yasur-Landau and Cline (2013).

## Spindle whorls and spinning

From the old excavations, 38 spindle whorls are recorded, of which only 13 are dated to the MBA and only eight of them securely (Oren 2002: table 10.3). When creating the database, only six spindle whorls dated to the MBA period were found and out of them only four derive from secure MBA contexts in Area D. Therefore, the information currently available to us is limited, yet still illuminating.

Of the four spindle whorls, one spherical and one lenticular whorl are made of clay, while two convex shaped whorls are made of bone and stone respectively (Fig. 6.16.1). Only one of the whorls was found in a room context, on the floor of Room 740, another was found in the east wall of the room, wall 692. The two other spindle whorls were found in a second storey collapse layer. The weight range of the spindle whorls is 8–21 g, which

indicates a production of very thin to medium spun yarn.

## Loom weights and weaving

With the exception of one stone loom weight, all of the MB II weights are made of fired clay. Forty-three of the clay loom weights have a conical shape; the remaining 18 are either fragmentary or do not have an assigned type. The loom weights were found in a variety of contexts; however, 13 were recovered from the eastern part of Room 690 in the palace, and 13 from the centre of the same room.

Nine of the loom weights from the eastern part of Room 690, nine of the weights from the the centre of Room 690 and a further 21 loom weights from other contexts had a recordable weight and thickness. The weight of these 39 loom weights varies from 235 g to 600 g and their thickness varies from 5.4 cm to 7.2 cm (Fig. 6.16.2).

None of the loom weights would have been suitable for use with thread needing less than *c.* 10 g tension. The smallest loom weight would function with very thin to thin thread needing *c.* 10–20 g; the heaviest weight would be suitable for use with thread requiring *c.* 20–60 g tension.

The nine loom weights from the eastern part of Room 690 would all be suitable for use with thin to medium thread needing

*Fig. 6.16.1. MB II spindle whorls: material, type, weight and diameter.*

| Type | Material | Weight (g) | Diameter (mm) |
|---|---|---|---|
| Spherical | clay | 8 | 28 |
| Convex | stone | 14 | 30 |
| Convex | bone | not known | 26 |
| Lenticular | clay | 21 | 42 |

*Fig. 6.16.2. Loom weights, MB II: context and weight/thickness. Please note, some markers represent more than one loom weight.*


*Fig. 6.16.3. Loom weights, MB II, palace, eastern part of Room 690: weight tension/ number of threads per cm in a tabby. The total number of analysed loom weights is nine.*

| Warp thr/cm | 15 g, N=6 | 20 g, N=9 | 25 g, N=9 | 30 g, N=9 | 35 g, N=7 | 40 g, N=5 | 45 g, N=3 | 50 g, N=3 | 55 g, N=2 |
|---|---|---|---|---|---|---|---|---|---|
| **3 thr** | | | | 1 | 2 | 2 | | 2 | 2 |
| **4 thr** | | | 3 | 5 | 2 | 2 | 3 | 1 | |
| **5 thr** | | 2 | 3 | 2 | 3 | 1 | | | |
| **6 thr** | 1 | 4 | 1 | 1 | | | | | |
| **7 thr** | 2 | | 2 | | | | | | |
| **8 thr** | 2 | 2 | | | | | | | |
| **9 thr** | 1 | 1 | | | | | | | |

*c.* 20–30 g tension (Fig. 6.16.3). In a tabby weave with thread needing *c.* 20 g tension the fabric produced would have *c.* 5–9 warp threads per centimetre; with thread needing *c.* 25 g or *c.* 30 g tension, the thread count would be *c.* 4–7 and *c.* 3–6 threads per centimetre respectively (in a twill weave the thread count would be approximately double). The loom weights could therefore work well together in the same loom setup.

The nine loom weights from the centre of Room 690 would also function well with thread needing *c.* 20–30 g tension and could produce fabrics within the same thread count ranges as the loom weights from the eastern part of the room.

## Summary

The analyses of the textile tools from late MB IIB contexts at Tel Kabri indicate a varied production of different types of textiles: textiles woven with thin threads and textiles woven with thicker thread. However, the analyses of the four spindle whorls demonstrate that only the thinner thread types would have been spun with these whorls.

The loom weights from the the centre of Room 690 in the palace and the loom weights from the eastern part of the same room could function together in setups using thread needing *c.* 20–30 g tension.

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