

# Report on the analysis of archaeological mineralised textile remains from the Iron Age tumulus of Creney-le-Paradis (Aube, France)

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## S1 Chemical composition of the metal substrate

The metal substrate was characterised by synchrotron  $\mu$ XRF. It was shown to be mainly copper-based with arsenic, calcium, silver and tin as minor elements and potassium, titanium, manganese, iron, rubidium as traces, indicating an arsenical bronze (Figure S1).

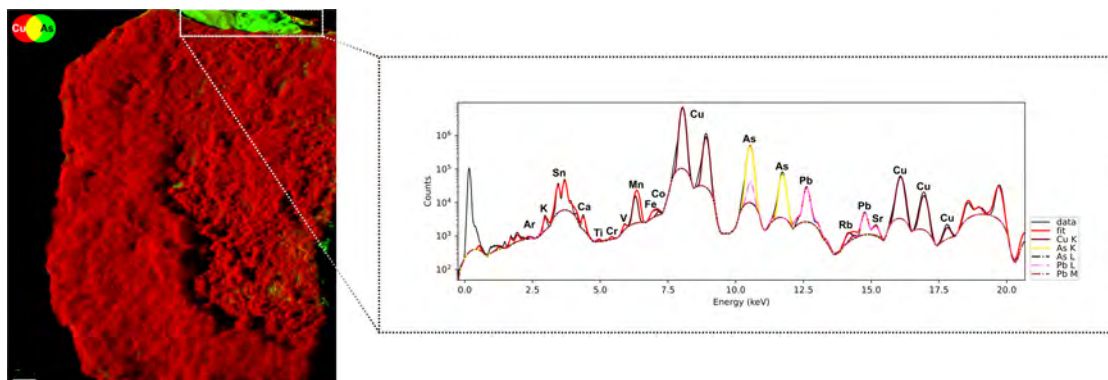


Figure S1: Characterisation of the metal substrate by synchrotron  $\mu$ XRF. False colour map of the elemental distribution of copper (red) and arsenic (green) in a sample. Insert: Spectrum of the elemental distribution of a specific area (white rectangle) of the sample where only the substrate is visible; scale bar: 1 mm.

## S2 Virtual technical analysis using synchrotron microtomography

This non-invasive technique allows access to the microscopic characteristics of internal sample morphologies without damage to their physical integrity or intensive preparation (Li *et al.* 2019; Iacconi *et al.* 2023).

### S2.1 Typical results for samples A1\_7, N1 and A1\_4

The three samples A1\_7, N1 and A1\_4 illustrate well the difference between the textiles studied in the context of this study:

- (i) While there was no previous evidence, **sample A1\_7** showed the unexpected presence of textiles on both sides (Figure S2c). The textile visible on one side of the sample (designated as layer A1) is a 2/2 twill S/z (Figure S2a,b). Very interestingly, the textile on the other side of the sample (designated as layer B1), which was buried in the corrosion crust, was identified as a tablet-woven textile (Figure S2d,e). Our innovative  $\mu$ CT approach (Iacconi *et al.* 2023) enabled its complete characterisation, including the weft yarns, which are notoriously impossible to study in tablet-woven textiles because they remain hidden (Collingwood 2015). We observed an alternation in the direction of twist of the warp yarns every two cords according to the following pattern: 2S, 2Z, 2S, 2Z, etc. This alternation alone creates a particular weaving pattern (Figure S2f–i). Unfortunately, mineralisation made it impossible to identify any dye that might have correlated with this pattern. As each cord corresponds to the use of a tablet, at least 18 to 19 tablets were used to weave this textile.  $\mu$ CT showed that each cord was composed of 4 warp yarns, indicating a four-strand warp twining leading to a thread count of 72–76 y/cm (Figure S3).
- (ii) **Sample N1** showed the presence of a second tablet-woven textile (Figure S4a–c), in a more altered state than the former. A similar alternation of the direction of twist of the warp yarns is observed according to the pattern: 2S, 2Z, 2S (Figure S4d–f). At least six 4-holes tablets were used to weave this textile.
- (iii) **Sample A1\_4** showed three superimposed textile layers (designated as A1–A3, from top to bottom), which we identified as 2/2 twills S/z (Figure S5). However, layer A1 (Figure S5a) appeared to have different technical characteristics from the other two layers (Figure S5b,d). This is the first time that a textile of such fineness and exceptional warp density has been identified in Creney, which has led to its identification as a new textile piece.

These results are summarised in Table S1.

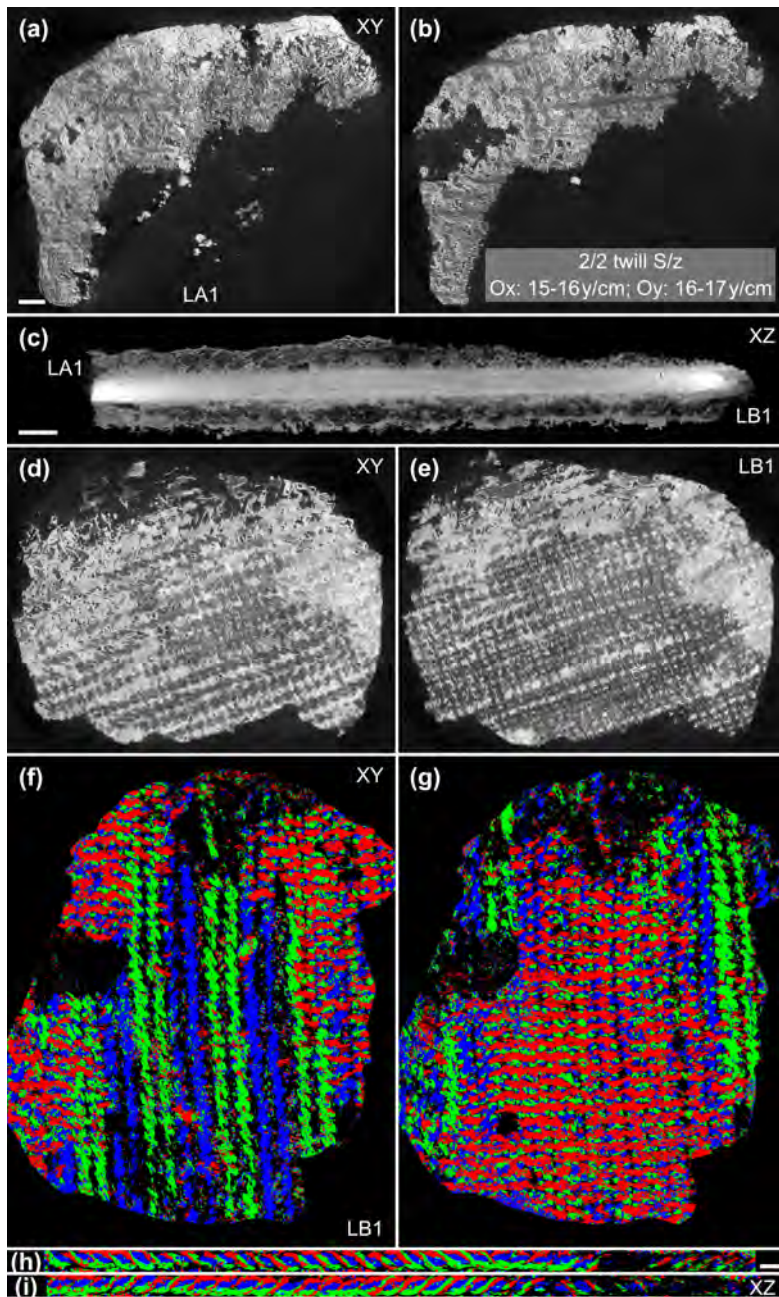


Figure S2: Identification and characterisation of a tablet-woven textile in sample A1\_7 by  $\mu$ CT. (a,b) XY virtual sections of layer A1. (c) Visualisation of textiles on both sides of the sample. (d,e) XY virtual sections of layer B1. (f-i) Virtual sections of the segmented layer B1. The alternating direction of twist of the warp yarns is represented by the false colours blue and green. The weft yarns are represented by the false colour red; all scale bars: 1 mm except in (h): 0.5 mm.

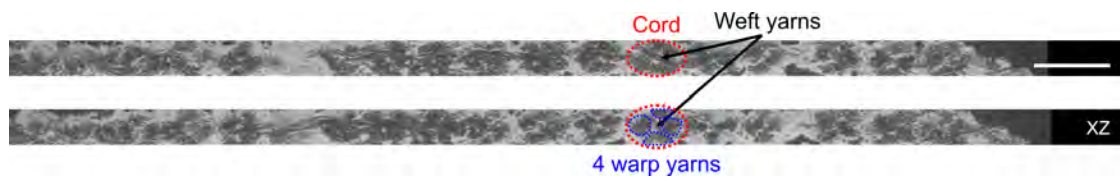


Figure S3: Determination by synchrotron  $\mu$ CT of the number of warp yarns carried by each tablet to weave the tablet-woven textile. XZ virtual sections of layer B1 of sample A1\_7. Each cord corresponds to the use of a tablet and each cord is composed of four warp yarns. Therefore, 4-holes tablets were used to weave the tablet-woven textile; scale bar: 1 mm.

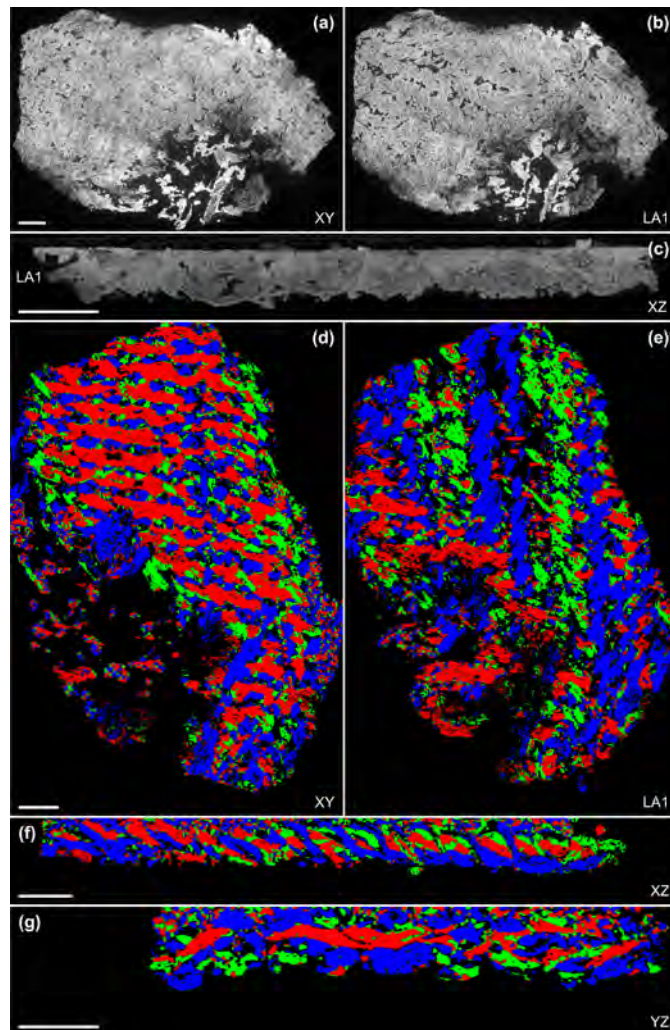


Figure S4: Identification of a tablet-woven textile in sample N1 by synchrotron  $\mu$ CT. (a–b) XY virtual sections of layer A1. (c) XZ virtual section. (d–g) Virtual sections of the segmented layer A1. The alternating direction of twist of the warp yarns is represented by the false colours blue and green. The weft yarns are represented by the false colour red; all scale bars: 1 mm.

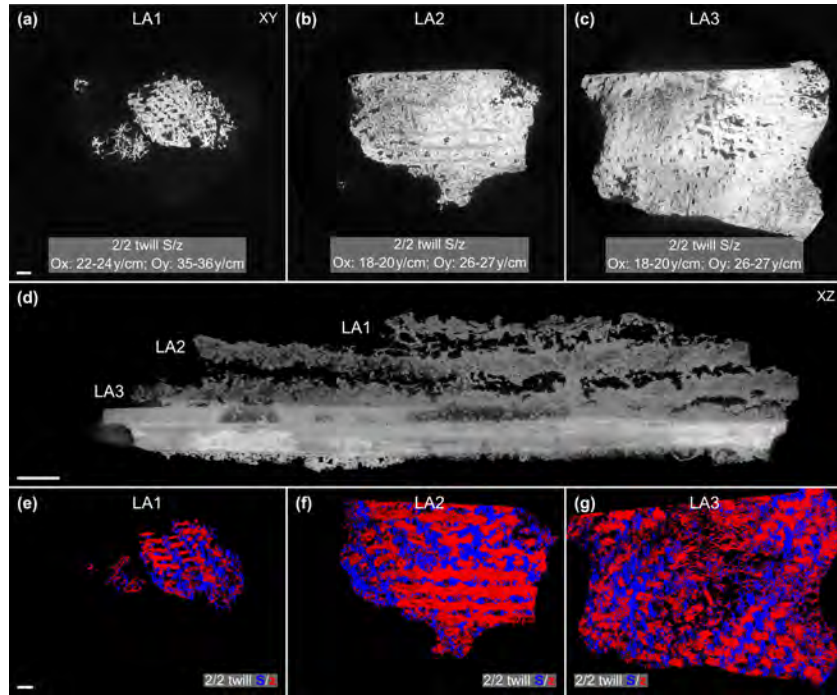


Figure S5: Identification of two different twills in sample A1\_4. (a) Layer A1: 2/2 twill S/z, 35–36 y/cm. (b,c) Layers A2–A3: 2/2 twill S/z, 26–27 y/cm. (d) Visualisation of the three superimposed layers A1–A3. (e–g) XY virtual sections of the segmented layers A1–A3. The warp yarns and the weft yarns are represented by the false colours blue and red, respectively; all scale bars: 1 mm.

Table S1: Results of the virtual technical analysis of the samples A1\_7, N1 and A1\_4, studied by μCT.

Sample	Weave type	Weft			Warp		
		Yarn type	Diam. [mm]	Thread count [y/cm]	Yarn type	Diam. [mm]	Thread count [y/cm]
A1_7 layer A1	2/2 twill	single z	$0.20 \pm 0.07$	15–16	plied S	$0.33 \pm 0.07$	16–17
A1_7 layer B1	Tablet-woven	single z	$0.13 \pm 0.01$	21–24	single z, s	$0.14 \pm 0.02$	72–76
N1	Tablet-woven	single z	$0.13 \pm 0.01$	19–21	single z, s	$0.13 \pm 0.01$	62
A1_4 layer A1	2/2 twill	single z	$0.19 \pm 0.05$	22–24	plied S	$0.33 \pm 0.08$	35–36
A1_4 layer A2	2/2 twill	single z	$0.21 \pm 0.08$	18–20	plied S	$0.33 \pm 0.07$	26–27
A1_4 layer A3	2/2 twill	single z	$0.22 \pm 0.08$	18–20	plied S	$0.34 \pm 0.09$	26–27

## S2.2 Results for sample A\_2

The layer A1 is a 2/2 twill S/z (Figure S6). The warp yarns appeared S-plied, with a median diameter of  $0.78 \pm 0.37$  mm and a thread count of 13–14 y/cm. The weft yarns are single z-twisted with a median diameter of  $0.29 \pm 0.13$  mm and a thread count of 12–14 y/cm. The median diameter of the fibres is  $39 \pm 18$   $\mu\text{m}$ . The thickness of the layer is measured at  $1.72 \pm 0.33$  mm.

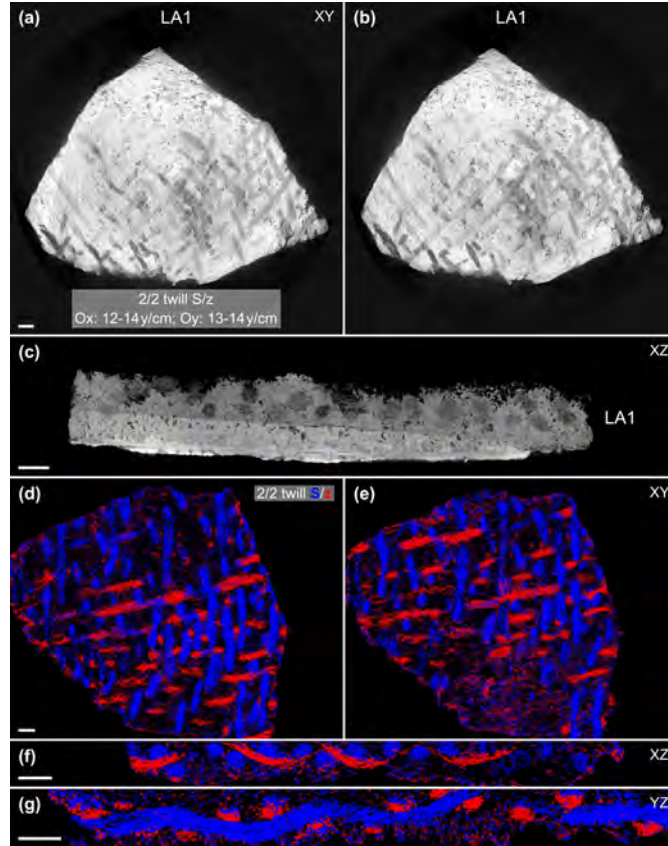


Figure S6: Identification of a 2/2 twill S/z in sample A\_2 by synchrotron  $\mu\text{CT}$ . (a–b) XY virtual sections of layer A1. (c) XZ virtual section. (d–g) Virtual sections of the segmented layer A1. The warp yarns and the weft yarns are represented by the false colours blue and red, respectively; all scale bars: 1 mm.

## S2.3 Results for sample A1\_1

The layer A1 is a 2/2 twill S/z and S/s (Figure S7). The warp yarns appeared S-plied, with a median diameter of  $0.38 \pm 0.12$  mm and a thread count of 23 y/cm. The weft yarns are single either z- or s-twisted with a median diameter of  $0.22 \pm 0.08$  mm and a thread count of 18 y/cm. We observed an alternation in the direction of twist of the weft yarns according to the following pattern: 3S, 5Z, 3S, Z. The median diameter of the fibres is  $44 \pm 16$   $\mu\text{m}$ . The thickness of the layer is  $0.56 \pm 0.23$  mm.



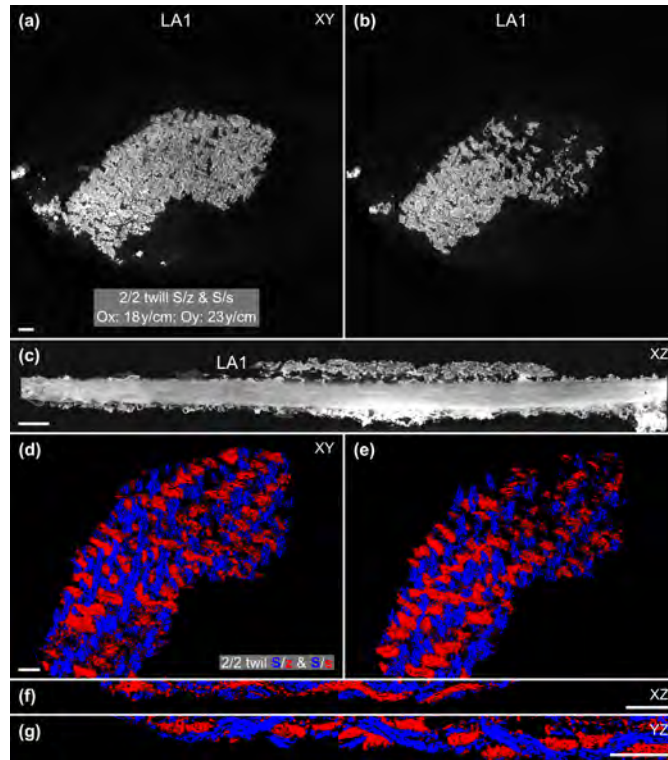


Figure S7: Identification of a 2/2 twill S/z & S/s in sample A1\_1 by synchrotron  $\mu$ CT. (a–b) XY virtual sections of layer A1. (c) XZ virtual section. (d–g) Virtual sections of the segmented layer A1. The warp yarns and the weft yarns are represented by the false colours blue and red, respectively; all scale bars: 1 mm.

## S2.4 Results for sample A1\_5

The layer A1 is a 2/2 twill S/s (Figure S8). The warp yarns appeared S-plied, with a median diameter of  $0.40 \pm 0.13$  mm and a thread count of 17–18 y/cm. The weft yarns are single s-twisted with a median diameter of  $0.20 \pm 0.07$  mm and a thread count of 13–18 y/cm. The median diameter of the fibres is  $58 \pm 22$   $\mu$ m. The thickness of the layer is  $0.62 \pm 0.29$  mm.

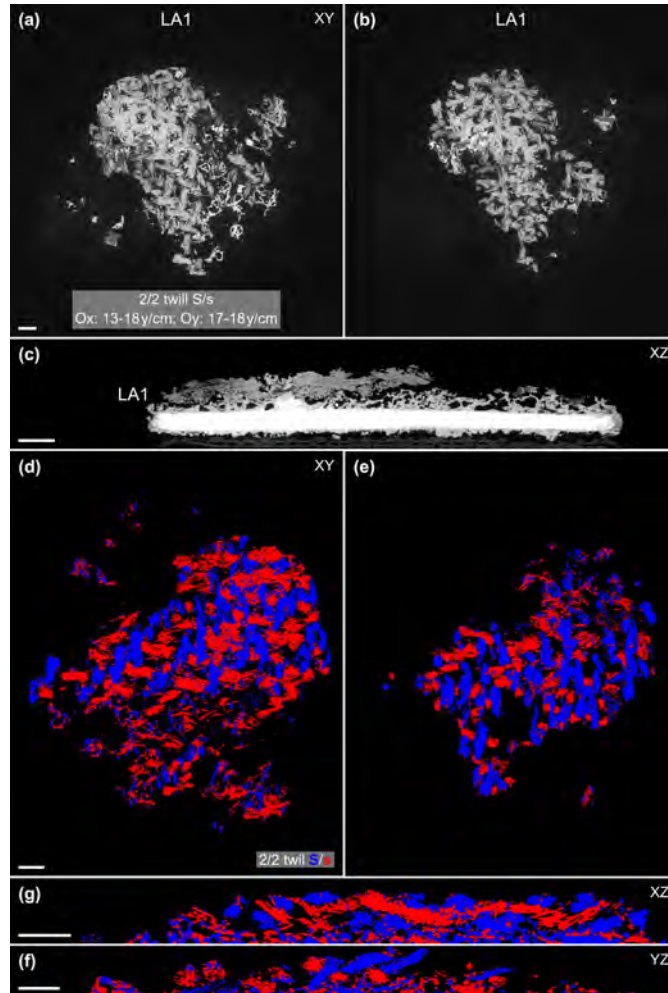


Figure S8: Identification of a 2/2 twill S/s in sample A1\_5 by synchrotron  $\mu$ CT. (a–b) XY virtual sections of layer A1. (c) XZ virtual section. (d–g) Virtual sections of the segmented layer A1. The warp yarns and the weft yarns are represented by the false colours blue and red, respectively; all scale bars: 1 mm.

## S2.5 Results for sample A1\_8

The layer A1 is a 2/2 twill S/z (Figure S9). The warp yarns appeared S-plied, with a median diameter of  $0.59 \pm 0.21$  mm and a thread count of 17–18 y/cm. The weft yarns are single z-twisted with a

median diameter of  $0.26 \pm 0.08$  mm and a thread count of 16 y/cm. The median diameter of the fibres is  $60 \pm 24$   $\mu\text{m}$ . The thickness of the layer is  $0.86 \pm 0.29$  mm.

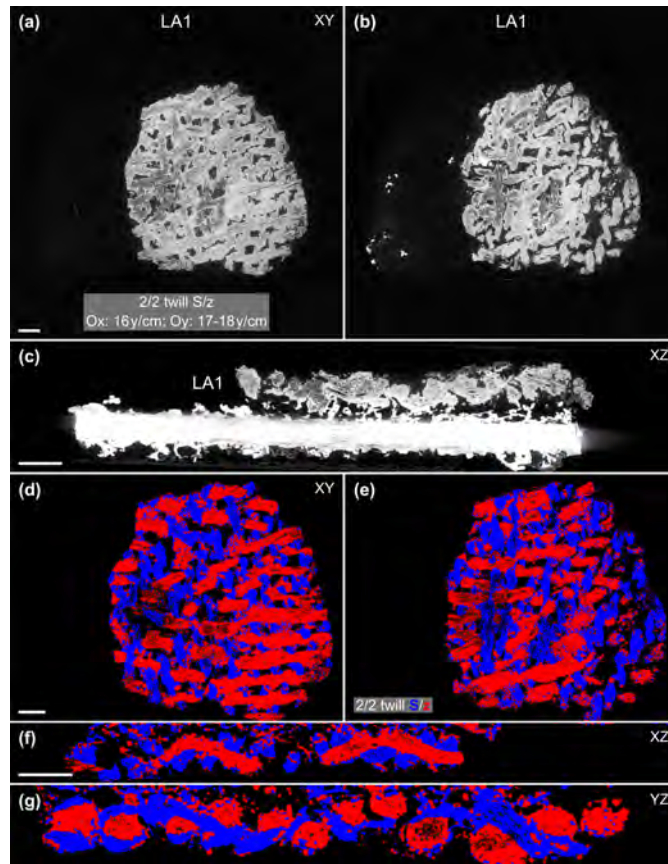


Figure S9: Identification of a 2/2 twill S/z in sample A1\_8 by synchrotron  $\mu\text{CT}$ . (a–b) XY virtual sections of layer A1. (c) XZ virtual section. (d–g) Virtual sections of the segmented layer A1. The warp yarns and the weft yarns are represented by the false colours blue and red, respectively; all scale bars: 1 mm.

## S2.6 Results for sample A2A3\_1

The layer A1 is a 2/2 twill S/z (Figure S10a,f). The warp yarns appeared S-plyed, with a median diameter of  $0.67 \pm 0.26$  mm and a thread count of 10 y/cm. The weft yarns are single z-twisted with a median diameter of  $0.40 \pm 0.12$  mm and a thread count of 10 y/cm. The median diameter of the fibres is  $39 \pm 16$   $\mu\text{m}$ . The thickness of the layer is  $1.23 \pm 0.21$  mm. The layer B3 is a 2/2 twill S/s (Figure S10b,g). The warp yarns appeared S-plyed, with a median diameter of  $0.54 \pm 0.21$  mm and a thread count of 18 y/cm. The weft yarns are single s-twisted with a median diameter of  $0.25 \pm 0.09$  mm and a thread count of 16 y/cm. The median diameter of the fibres is  $29 \pm 8$   $\mu\text{m}$ . The thickness of the layer is  $0.51 \pm 0.09$  mm. The layer B2 is a 2/2 twill S/s (Figure S10d, h). The warp

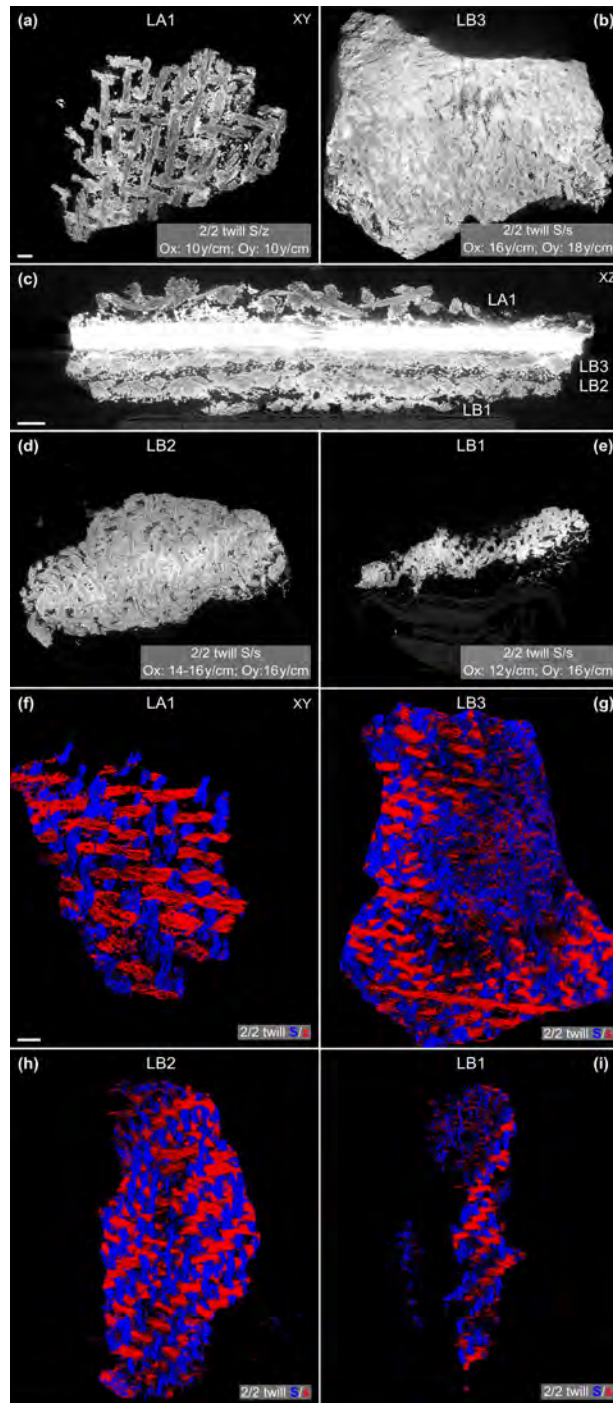


Figure S10: Identification of a 2/2 twill S/z and 2/2 twills S/z in sample A2A3\_1 by synchrotron  $\mu$ CT. (a) XY virtual section of layer A1. (b) XY virtual section of layer B3. (c) XZ virtual section. (d–e) XY virtual sections of layer B2–B1. (f) Virtual section of the segmented layer A1. (g–i) Virtual section of the segmented layer B3–B1. The warp yarns and the weft yarns are represented by the false colours blue and red, respectively; all scale bars: 1 mm.

yarns appeared S-plyed, with a median diameter of  $0.49 \pm 0.17$  mm and a thread count of 16 y/cm. The weft yarns are single s-twisted with a median diameter of  $0.30 \pm 0.11$  mm and a thread count of 14–16 y/cm. The median diameter of the fibres is  $33 \pm 10$   $\mu$ m. The thickness of the layer is  $0.44 \pm 0.15$  mm. The layer B1 is a 2/2 twill S/s (Figure S10e, i). The warp yarns appeared S-plyed, with a median diameter of  $0.42 \pm 0.13$  mm and a thread count of 16 y/cm. The weft yarns are single s-twisted with a median diameter of  $0.20 \pm 0.06$  mm and a thread count of 12 y/cm. The median diameter of the fibres is  $33 \pm 10$   $\mu$ m. The thickness of the layer is  $0.28 \pm 0.09$  mm.

## S2.7 Results for sample A2A3\_3

The layer A1 is a 2/2 twill S/s (Figure S11a, e). The warp yarns appeared S-plyed, with a median diameter of  $0.39 \pm 0.12$  mm and a thread count of 14–15 y/cm. The weft yarns are single s-twisted with a median diameter of  $0.21 \pm 0.06$  mm and a thread count of 14–17 y/cm. The median diameter of the fibres is  $39 \pm 15$   $\mu$ m. The thickness of the layer is  $0.39 \pm 0.12$  mm. The layer A2 is a 2/2 twill

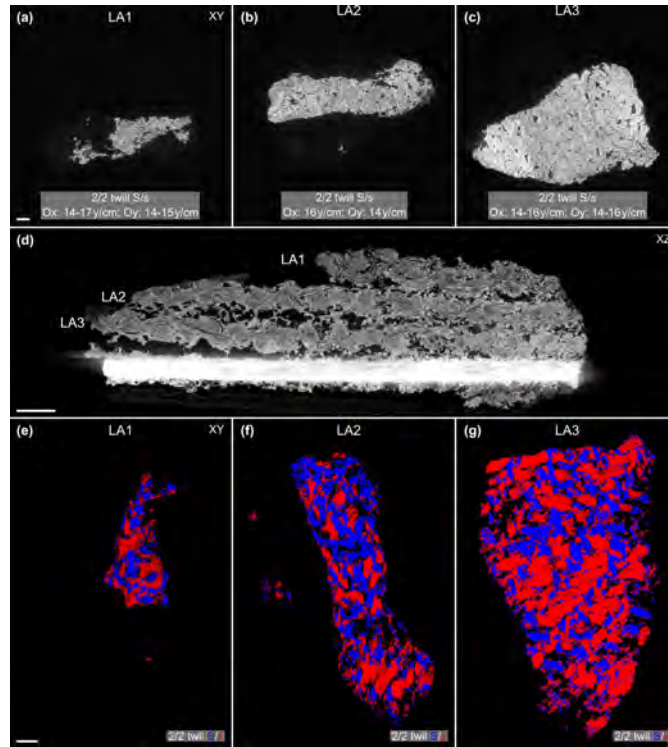


Figure S11: Identification of 2/2 twills S/s in sample A2A3\_3 by synchrotron  $\mu$ CT. (a–c) XY virtual sections of layer A1–A3. (d) XZ virtual section. (e–g) Virtual sections of the segmented layer A1–A3. The warp yarns and the weft yarns are represented by the false colours blue and red, respectively; all scale bars: 1 mm.

S/s (Figure S11b, f). The warp yarns appeared S-plyed, with a median diameter of  $0.41 \pm 0.14$  mm and a thread count of 14 y/cm. The weft yarns are single s-twisted with a median diameter of  $0.18 \pm$

0.05 mm and a thread count of 16 y/cm. The median diameter of the fibres is  $47 \pm 17 \mu\text{m}$ . The thickness of the layer is  $0.47 \pm 0.14 \text{ mm}$ . The layer A3 is a 2/2 twill S/s (Figure S11c, g). The warp yarns appeared S-plyed, with a median diameter of  $0.45 \pm 0.16 \text{ mm}$  and a thread count of 14–16 y/cm. The weft yarns are single s-twisted with a median diameter of  $0.22 \pm 0.08 \text{ mm}$  and a thread count of 14–16 y/cm. The median diameter of the fibres is  $50 \pm 21 \mu\text{m}$ . The thickness of the layer is  $0.50 \pm 0.15 \text{ mm}$ .

### **S2.8 Results for sample B\_1**

The layer A1 is a 2/2 twill S/z and S/s (Figure S12). The warp yarns appeared S-plyed, with a median diameter of  $0.59 \pm 0.25 \text{ mm}$  and a thread count of 20 y/cm. The weft yarns are single either z- or s-twisted with a median diameter of  $0.25 \pm 0.11 \text{ mm}$  and a thread count of 18 y/cm. We observed an alternation in the direction of twist of the weft yarns according to the following pattern: 3S, 5Z. The median diameter of the fibres is  $35 \pm 13 \mu\text{m}$ . The thickness of the layer is  $1.55 \pm 0.27 \text{ mm}$ .

### **S2.9 Results for sample B\_3**

The layer A1 is a 2/2 twill S/z (Figure S13). The warp yarns appeared S-plyed, with a median diameter of  $0.65 \pm 0.31 \text{ mm}$  and a thread count of 10–12 y/cm. The weft yarns are single z-twisted with a median diameter of  $0.37 \pm 0.16 \text{ mm}$  and a thread count of 10–12 y/cm. The median diameter of the fibres is  $44 \pm 22 \mu\text{m}$ . The thickness of the layer is  $1.21 \pm 0.41 \text{ mm}$ .

### **S2.10 Results for sample B\_6**

The layer A1 is a 2/2 twill S/s (Figure S14). The warp yarns appeared S-plyed, with a median diameter of  $0.75 \pm 0.44 \text{ mm}$  and a thread count of 11–13 y/cm. The weft yarns are single s-twisted with a median diameter of  $0.21 \pm 0.12 \text{ mm}$  and a thread count of 12–14 y/cm. The median diameter of the fibres is  $42 \pm 17 \mu\text{m}$ . The thickness of the layer is  $0.88 \pm 0.60 \text{ mm}$ .

### **S2.11 Results for sample M\_4**

The layer A1 is a 2/2 twill S/s (Figure S15). The warp yarns appeared S-plyed, with a median diameter of  $0.49 \pm 0.14 \text{ mm}$  and a thread count of 15–16 y/cm. The weft yarns are single s-twisted with a median diameter of  $0.26 \pm 0.10 \text{ mm}$  and a thread count of 15–16 y/cm. The median diameter of the fibres is  $33 \pm 10 \mu\text{m}$ . The thickness of the layer is  $0.67 \pm 0.21 \text{ mm}$ .

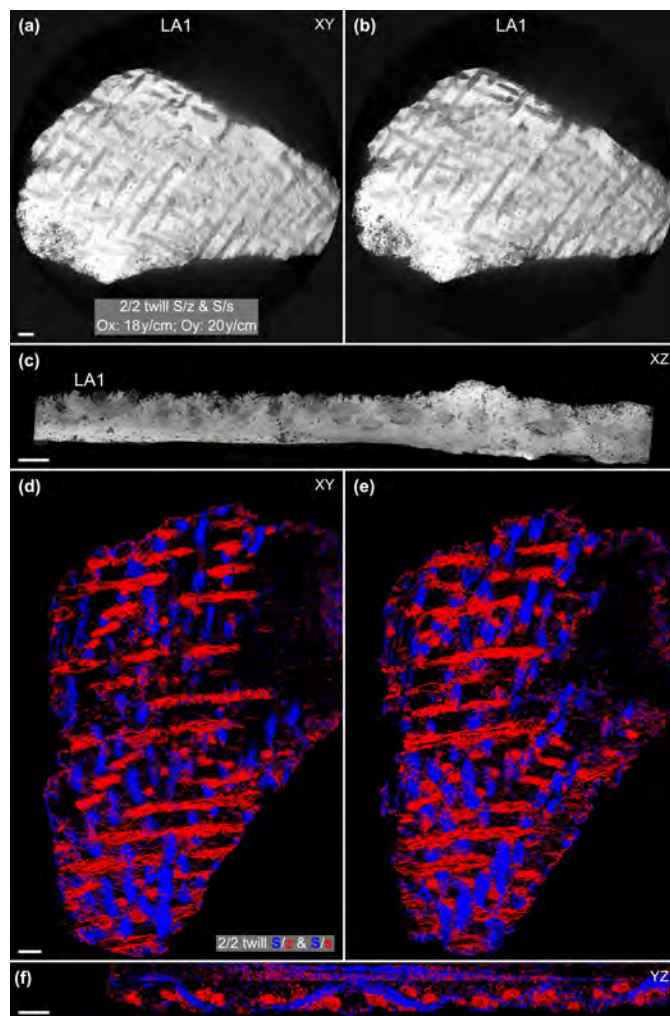


Figure S12: Identification of a 2/2 twill S/z & S/s in sample B\_1 by synchrotron  $\mu$ CT. (a–b) XY virtual sections of layer A1. (c) XZ virtual section. (d–f) Virtual sections of the segmented layer A1. The warp yarns and the weft yarns are represented by the false colours blue and red, respectively; all scale bars: 1 mm.

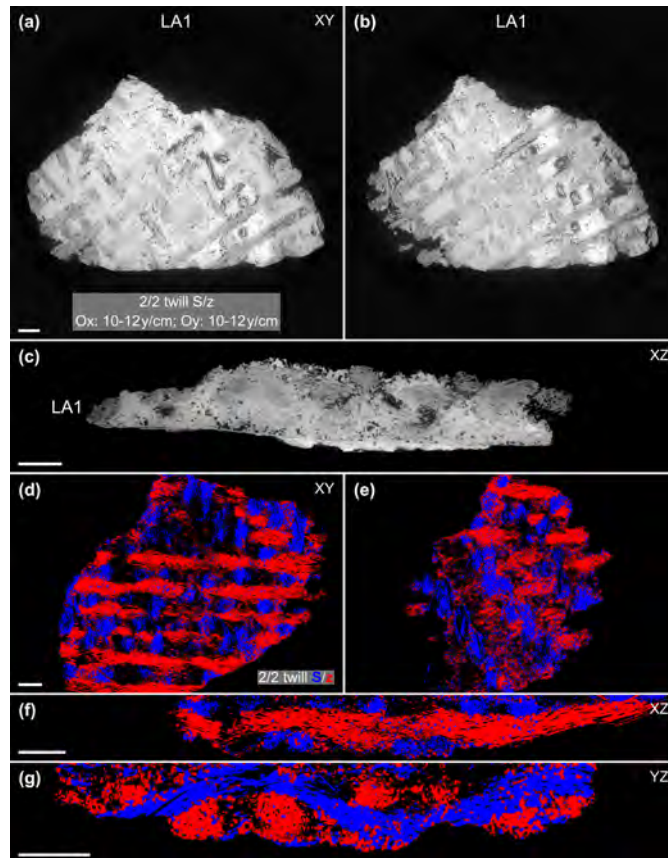


Figure S13: Identification of a 2/2 twill S/z in sample B\_3 by synchrotron  $\mu$ CT. (a–b) XY virtual sections of layer A1. (c) XZ virtual section. (d–g) Virtual section of the segmented layer A1. The warp yarns and the weft yarns are represented by the false colours blue and red, respectively; all scale bars: 1 mm.



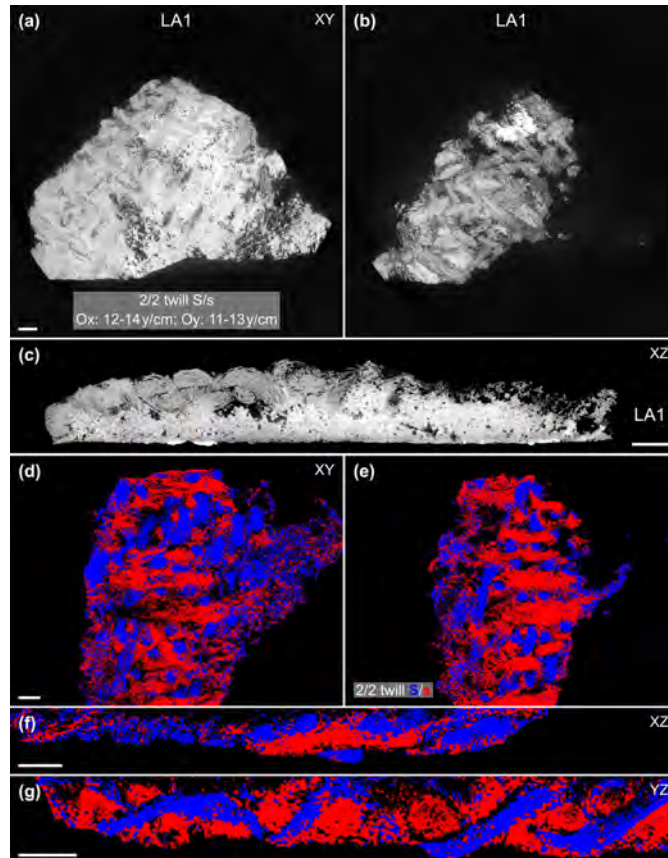


Figure S14: Identification of a 2/2 twill S/s in sample B\_6 by synchrotron  $\mu$ CT. (a–b) XY virtual sections of layer A1. (c) XZ virtual section. (d–g) Virtual sections of the segmented layer A1. The warp yarns and the weft yarns are represented by the false colours blue and red, respectively; all scale bars: 1 mm.

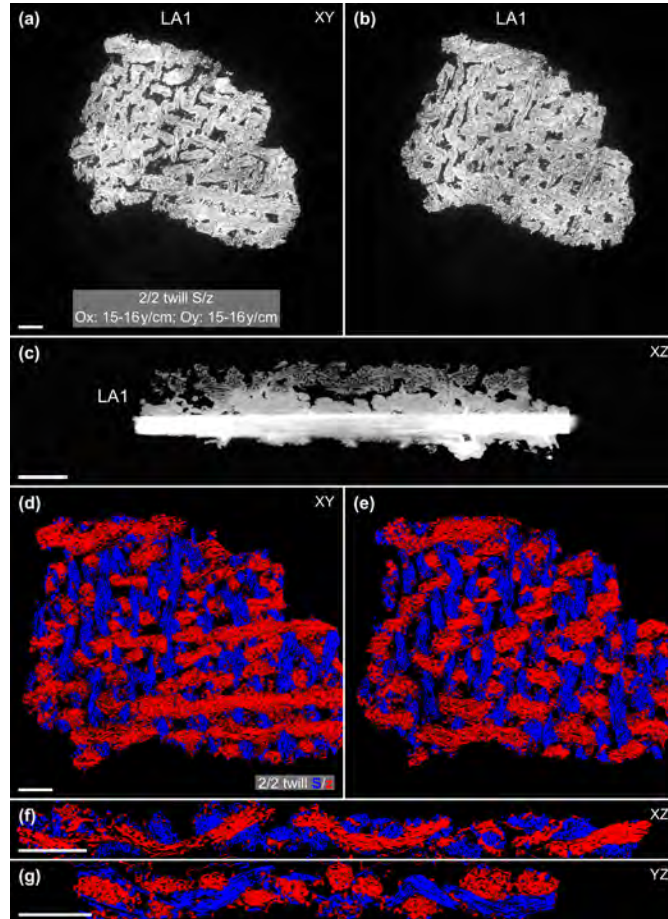


Figure S15: Identification of a 2/2 twill S/s in sample M\_4 by synchrotron  $\mu$ CT. (a–b) XY virtual sections of layer A1. (c) XZ virtual section. (d–g) Virtual sections of the segmented layer A1. The warp yarns and the weft yarns are represented by the false colours blue and red, respectively; all scale bars: 1 mm.

### S3 Comprehensive results of the technical analysis of the textiles

**Table S2: Technical analysis of the textiles of Creney-le-Paradis. Ox and Oy correspond to the yarn systems of a weave, i.e. weft and warp if they can be determined. Crosses (×): parameters that could not be determined for the corresponding sample. The samples indicated in bold were studied by  $\mu$ CT.**

Sample	Weave type	Ox			Oy		
		Yarn type	Diam. [mm]	Thread count [y/cm]	Yarn type	Diam. [mm]	Thread count [y/cm]
5_ro_1	2/2 Twill	single z	0.39–0.66	14	single z	0.48–0.63	12
A_1	2/2 Twill	single z	0.30	15	single z	0.40–0.50	17–18
5_u_a	2/2 Twill	single z, s	0.26–0.40	25	single z, s	0.31–0.50	21
5_u_g	2/2 Twill	single s	0.34–0.42	20–22	single s,z	0.42–0.55	19
A1_6 layer A1	2/2 Twill	single z,s	0.26–0.33	22	single z,s	0.32–0.35	17–18
A1_6 layer A2	2/2 Twill	single s	0.22–0.33	18–19	single z	0.30	24
G_9	2/2 or 2/1 Twill	single s	0.40–0.48	23	single z	0.40–0.45	18
M_7	2/2 or 2/1 Twill	single s,z	0.28–0.42	20	single z	0.36–0.39	21
B_2	2/2 or 2/1 Twill (bal.)	single z	0.42–0.58	20	single z	0.46–0.50	21–22
G_2	2/2 Twill (bal.)	single z	0.36–0.40	23	single z	0.32–0.41	23
G_6	2/2 Twill (bal.)	single z	0.30–0.50	21–23	single z	×	20–22
M_6	2/2 Twill (bal.)	single z	0.29–0.47	21	single z	0.30–0.37	21
G_7	2/2 or 2/1 Twill (bal.)	single s	0.31	27–29	single z	×	27
G_17 layer A1	2/2 or 2/1 Twill (bal.)	single s	0.27–0.34	25	single z	0.26–0.36	27
N4	2/2 or 2/1 Twill	single s	0.29–0.45	21	single s	0.26–0.29	31
<b>A2A3_1 layer A1</b>	2/2 Twill (bal.)	single z	0.40 ± 0.12	10	plied S	0.67 ± 0.26	10
<b>B_3</b>	2/2 Twill (bal.)	single z	0.37 ± 0.16	10–12	plied S	0.65 ± 0.31	10–12
N11	2/2 or 2/1 Twill (bal.)	single s or z	0.28–0.40	10	plied S	0.36	10–11
<b>A_2</b>	2/2 Twill	single z	0.29 ± 0.13	12–14	plied S	0.78 ± 0.37	13–14
<b>A1_5</b>	2/2 Twill	single s	0.20 ± 0.07	13–18	plied S	0.40 ± 0.13	17–18
<b>B_6</b>	2/2 Twill	single s	0.21 ± 0.12	12–14	plied S	0.75 ± 0.44	11–13
5_c_3	2/2 or 2/1 Twill (bal.)	single z	0.43–0.60	17	plied S	0.34–0.54	18
5_c_4	2/2 or 2/1 Twill (bal.)	single z	0.45	16	plied S	0.54	16–17
5_u_d	2/2 or 2/1 Twill (bal.)	single s	0.36–0.49	16	plied S	0.55	17
<b>A1_7 layer A1</b>	2/2 Twill (bal.)	single z	0.20 ± 0.07	15–16	plied S	0.33 ± 0.07	16–17
<b>A1_8</b>	2/2 Twill (bal.)	single z	0.26 ± 0.08	16	plied S	0.59 ± 0.21	17–18

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**Table S2: (continued)**

Sample	Weave type	Ox			Oy		
		Type of yarn	Diam. [mm]	Thread count [y/cm]	Type of yarn	Diam. [mm]	Thread count [y/cm]
<b>A2A3_1 layer B1</b>	2/2 Twill (bal.)	single s	0.20 ± 0.06	12	plied S	0.42 ± 0.13	16
<b>A2A3_1 layer B2</b>	2/2 Twill (bal.)	single s	0.30 ± 0.11	14–16	plied S	0.49 ± 0.17	16
<b>A2A3_1 layer B3</b>	2/2 Twill (bal.)	single s	0.25 ± 0.09	16	plied S	0.54 ± 0.21	18
<b>A2A3_3 layer A1</b>	2/2 Twill (bal.)	single s	0.21 ± 0.06	14–17	plied S	0.39 ± 0.12	14–15
<b>A2A3_3 layer A2</b>	2/2 Twill (bal.)	single s	0.18 ± 0.05	16	plied S	0.41 ± 0.14	14
<b>A2A3_3 layer A3</b>	2/2 Twill (bal.)	single s	0.22 ± 0.08	14–16	plied S	0.45 ± 0.16	14–16
<b>M_4</b>	2/2 Twill (bal.)	single z	0.26 ± 0.10	15–16	plied S	0.49 ± 0.14	15–16
5_c_1	2/2 or 2/1 Twill	single s, z	0.37–0.44	17	plied S	0.30–0.55	20
5_c_2_1 layer A1	2/2 Twill	single z, s	0.31–0.44	18	plied S	0.47–0.58	21
5_c_2_1 layer B1	2/2 Twill	single z, s	0.31–0.44	21	plied S	0.39–0.48	24
<b>A1_1</b>	2/2 Twill	single s, z	0.22 ± 0.08	18	plied S	0.38 ± 0.12	23
<b>B_1</b>	2/2 Twill	single s, z	0.25 ± 0.11	18	plied S	0.59 ± 0.25	20
G_1 layer A2	2/2 Twill	single z	0.42–0.48	15	plied S	0.38–0.42	20
5_ro_8 layer B1	2/2 or 2/1 Twill	single z	0.40–0.50	22	plied S	0.40–0.50	24
G_11 layer A2	2/2 or 2/1 Twill	single z	0.40–0.50	22	plied S	0.40–0.50	20–24
<b>A1_4 layer A2</b>	2/2 Twill	single z	0.21 ± 0.08	18–20	plied S	0.33 ± 0.07	26–27
<b>A1_4 layer A3</b>	2/2 Twill	single z	0.22 ± 0.08	18–20	plied S	0.34 ± 0.09	25–27
<b>A1_4 layer A1</b>	2/2 Twill	single z	0.19 ± 0.05	22–24	plied S	0.33 ± 0.08	35–36
5_u_c	Twill	×	×	×	×	×	×
A_3	Twill	×	×	×	×	×	×
A1_3 layer A1	Twill	×	×	×	×	×	×
A1_3 layer A2	Twill	×	×	×	×	×	×
A1_10	Twill	×	×	×	single z	×	×
A2A3_2 layer A1	Twill	×	×	×	single s	0.33	×
A2A3_2 layer A2	Twill	×	×	×	×	×	×
N16	Twill	×	×	×	×	0.29	×
5_u_1_I	Tablet (17–18)	single z	0.27–0.36	24	single ss,zz,ss,zz, ss,zz,ss	0.27–0.33	72
5_u_j	Tablet (4)	×	×	×	single ss,zz	0.25–0.31	70

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**Table S2: (continued)**

Sample	Weave type	Ox			Oy		
		Type of yarn	Diam. [mm]	Thread count [y/cm]	Type of yarn	Diam. [mm]	Thread count [y/cm]
<b>A1_7 layer B1</b>	Tablet (18–19)	single z	0.13±0.01	21–24	single z,ss,zz,ss,zz,ss,zz,ss,z	0.14±0.02	72–76
A1_12	Tablet (9)	×	×	×	single z,ss,zz,ss,zz	0.25–0.29	72
5_u_1_II	Tablet (7)	×	×	×	single s, zz, ss, zz	0.30–0.34	56
5_u_i	Tablet (3)	×	×	×	single s,zz	0.33–0.37	63
<b>N1</b>	Tablet (6)	single z	0.13±0.01	19–21	single zz,ss,zz	0.13±0.01	62
BC_1 layer B1	Weft-faced tabby	plied S	0.27–0.40	34	single z	0.33	20
5_ro_2	×	×	×	×	×	×	×
5_ro_3	×	×	×	×	×	×	×
5_ro_4	×	×	×	×	×	×	×
5_ro_5	×	×	×	×	×	×	×
5_ro_6	×	×	×	×	×	×	×
5_ro_7	×	×	×	×	×	×	×
5_ro_8 layer A1	×	×	×	×	×	×	×
5_u_b	×	×	×	×	×	×	×
5_u_e	×	×	×	×	×	×	×
5_u_f	×	×	×	×	×	×	×
5_u_h	×	×	×	×	×	×	×
A1_2 layer A1	×	×	×	×	×	×	×
A1_2 layer A2	×	×	×	×	×	×	×
A1_9	×	×	×	×	×	×	×
A1_11	×	single z, s	0.26–0.37	×	×	×	×
A1_13 layer A1	×	×	×	×	×	×	×
A1_13 layer A2	×	×	×	×	×	×	×
A1_13 layer A3	×	×	×	×	×	×	×
A1_14	×	×	×	×	×	×	×
A1_15	×	×	×	×	×	×	×

*Continued on next page.*

**Table S2: (continued)**

Sample	Weave type	Ox			Oy		
		Type of yarn	Diam. [mm]	Thread count [y/cm]	Type of yarn	Diam. [mm]	Thread count [y/cm]
A1_16	×	single s	×	×	single z	0.42–0.45	×
A2A3_3 layer B1	×	×	×	×	×	×	×
A2A3_4	×	×	×	×	×	×	×
B_4	×	×	×	×	×	×	×
B_5 layer A1	×	×	×	×	×	×	×
B_5 layer A2	×	×	×	×	×	×	×
B_7 layer A1	×	×	×	×	×	×	×
B_7 layer A2	×	×	×	×	×	×	×
B_8	×	single z	0.52	×	single z	0.43	×
BC_1 layer A1	×	×	×	×	×	×	×
BC_1 layer A2	×	×	×	×	×	×	×
BC_1 layer A3	×	×	×	×	×	×	×
BC_2 layer A1	×	×	×	×	×	×	×
BC_2 layer B1	×	×	×	×	×	×	×
G_1 Layer A1	×	×	×	×	×	×	×
G_1 Layer A3	×	×	×	×	×	×	×
G_3 layer A1	×	×	×	×	×	×	×
G_3 layer A2	×	×	×	×	×	×	×
G_4	×	×	×	×	×	×	×
G_5	×	×	×	×	×	×	×
G_8	×	×	×	×	×	×	×
G_10	×	×	×	×	×	×	×
G_11 layer A1	×	×	×	×	×	×	×
G_12	×	×	×	×	×	×	×
G_13	×	×	×	×	×	×	×
G_14	×	×	×	×	single z	0.28–0.33	×
G_15 layer A1	×	×	×	×	×	×	×
G_15 layer A2	×	×	×	×	×	×	×
G_15 layer A3	×	×	×	×	×	×	×
G_16	×	×	×	×	×	×	×

*Continued on next page.*

**Table S2: (continued)**

Sample	Weave type	Ox			Oy		
		Type of yarn	Diam. [mm]	Thread count [y/cm]	Type of yarn	Diam. [mm]	Thread count [y/cm]
G_17 layer A2	×	×	×	×	×	×	×
G_17 layer A3	×	×	×	×	×	×	×
G_18	×	×	×	×	×	×	×
M_1 layer A1	×	×	×	×	×	×	×
M_1 layer A2	×	×	×	×	×	×	×
M_2	×	×	×	×	×	×	×
M_3	×	×	×	×	×	×	×
M_5	×	×	×	×	×	×	×
N2	×	×	0.35–0.41	×	0.38	×	×
N3 layer A1	×	×	×	×	×	×	×
N3 layer A2	×	×	×	×	×	×	×
N3 layer B1	×	×	×	×	×	×	×
N5	×	×	×	×	×	×	×
N6	×	×	×	×	×	×	×
N7	×	×	×	×	×	×	×
N8	×	×	×	×	×	×	×
N9	×	×	×	×	×	×	×
N10	×	×	×	×	×	×	×
N12	×	×	×	×	×	×	×
N13	×	×	×	×	×	×	×
N14	×	×	×	×	×	×	×
N15 layer A1	×	×	×	×	×	×	×
N15 layer A2	×	×	×	×	×	×	×
N17 layer A1	×	×	×	×	×	×	×
N17 layer A2	×	×	×	×	×	×	×

We have therefore identified at least 16 textile items: 13 different twills, 2 different tablet-woven textiles and a tabby.

## S4 Complementary discussion

### S4.1 Overview of Iron Age cremation burials in Europe

Table S3: List of Iron Age cremation burials that yielded textiles.

Site	Dating	Weave type			Material	Ref.
		Twill	Tabby	Tablet-woven		
Denmark						
Lusehøj	10th-8th BC		×		Nettle, wool	(Bergfjord <i>et al.</i> 2012; Bender Jørgensen 1986: 192)
France						
Barberey-Saint-Sulpice	500-475 BC	×			Wool	(Villes <i>et al.</i> 1995: 55–56)
Bouranton	5th BC	×	×			(Baray <i>et al.</i> 2013)
Charmoy (SP 6)	Late 6th-5th BC	×	×		Wool	(Desplanques 2016 – unpublished)
Charmoy (SP 7)	Late 6th-5th BC	×	×		Wool, bast	(Desplanques 2016 – unpublished)
Creney-le-Paradis	Late 6th-5th BC	×	×	×	Wool	
Estissac	5th BC	×			Wool	(Deffressigne 1992; Villes <i>et al.</i> 1995: 59–67)
Gurgy	5th BC	×			Wool	(Villes <i>et al.</i> 1995: 86–91)
Mardié	525-475 BC	×		×	Wool	(Banck-Burgess 1999: 213; Milcent and Moulherat 1999: 307)
Mercey-sur-Saône tumulus 2	525-475 BC	×		×	Wool	(Milcent 2004: 264)
Noslon	575-400 BC	×			Wool	(Pelletier and Delor 1980; Villes 1999; Villes 1995)

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**Table S3: (continued)**

Site	Dating	Weave type			Material	Ref.
		Twill	Tabby	Tablet-woven		
Sainte-Geneviève-des-Bois central grave	525-475 BC		×		Wool	(Milcent and Moulherat 1999)
Sainte-Geneviève-des-Bois secondary grave	525-400 BC	×	×		Wool	(Milcent and Moulherat 1999)
Sessenheim	480-410 BC	×			Wool	(Burg 1952: 62)
Germany						
Petershagen-Döhren	525-475 BC		×			(Banck-Burgess 1999: 198)
Wallscheid	530-325 BC	×	×		Wool	(Banck-Burgess 1999: 209)
Greece						
Athènes (HTR 73)	5th BC		×		Linen, cotton	(Banck-Burgess 1999: 228; Albanese Procelli 2004: 80; Carroll and Wild 2012; Guggisberg 2008; Margariti, Protopapas <i>et al.</i> 2010; Moulherat and Spantidaki 2012)
Argos	7th BC		×		Bast, wool	(Margariti and Papadimitriou 2014)
Corfou (5 urns)	7th BC		×		Linen, wool	(Metallinou <i>et al.</i> 2009; Moulherat and Spantidaki 2012)

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**Table S3: (continued)**

Site	Dating	Weave type			Material	Ref.
		Twill	Tabby	Tablet-woven		
Démétrias	4th BC		×		Linen	(Asderaki <i>et al.</i> 2004; Moulherat and Spantidaki 2012)
Egine	5th BC		×		Linen	(Moulherat and Spantidaki 2012)
Eleusis	5th BC		×		Linen	(Moulherat and Spantidaki 2012; Mylonas 1975: 256–259)
Ellinikon	4th BC		×		Linen	(Spantidaki and Moulherat 2004: 6)
Erétrie (3 urns)	8-7th BC		×		Linen	(Banck-Burgess 1999: 227)
Glypada	5th BC		×		Linen	(Descamps <i>et al.</i> 2015)
Kamatero	5th BC		×		Wool	(Moulherat and Spantidaki 2012)
Koropi	5-4th BC				Linen	(Banck-Burgess 1999: 227; Beckwith 1954: Figure 1-2)
Marathon	5th BC		×		Linen	(Moulherat and Spantidaki 2012; Guggisberg 2008; Albanese Procelli 2004: 80)
Maroussi	5th BC		×			(Moulherat and Spantidaki 2012; Spantidaki and Moulherat 2004: 8)
Merenda	5th BC		×			(Moulherat and Spantidaki 2012)

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**Table S3: (continued)**

Site	Dating	Weave type			Material	Ref.
		Twill	Tabby	Tablet-woven		
Moschato	5th BC		×		Linen	(Moulherat and Spantidaki 2012)
Trachones	4th BC		×		Hemp, cotton	(Zisis 1955; Carroll and Wild 2012)
Vergina	6th BC		×		Plant fibres	(Moraitou 2001: 527–537)
Vergina Tomb of Philip II	4th BC				Wool	(Flury-Lemberg 1988; Carroll and Wild 2012; Moulherat and Spantidaki 2012)
Italy						
Altino	5th BC		×		Linen	(Ruta Serafini and Gleba 2018: 210)
Casale Marittimo, Casa Nocera burial A	700-600 BC		×		Linen	(Moulherat and Spantidaki 2012; Gleba, Heitz <i>et al.</i> 2018: 50)
Chianciano Poggio alla Salla	7th BC	×				(Banck-Burgess 1999: 228) (Gleba, Heitz <i>et al.</i> 2018: 51)
Cumes Artiacco 104	8th BC		×		Wool	(Gleba, Heitz <i>et al.</i> 2018: 57)
Cumes (5 cinerary cauldrons)	7-5th BC		×		Plant, animal	
Pieve d'Alpago burial 10	6th BC	×			Wool	(Ruta Serafini and Gleba 2018: 211)
Tarquinia T M9	8th BC	×				(Gleba, Heitz <i>et al.</i> 2018: 55)
Verucchio tomba del trono	700–650 BC			×	Wool	(Ræder Knudsen 2002; Stauffer 2002: 213)

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**Table S3: (continued)**

Site	Dating	Weave type			Material	Ref.
		Twill	Tabby	Tablet-woven		
Luxembourg						
Altrier	5th BC	×		×	Wool	(Rast-Eicher <i>et al.</i> 2022; Thill 1987: 251–254)
Netherlands						
Oss-vorstengraf	8-7th BC	×	×		Wool	(Banck-Burgess 1999: 217)

## S4.2 Overview of Iron Age burials with tablet-woven textiles in Europe

**Table S4: Overview of Iron Age burials that yielded tablet-woven textiles.**

Site	Dating	Use and function			Ref.	
		Unspecified	Ribbon	Border		Starting edges
Austria						
Dürrenberg (salt mine)	6th–4th BC			×	(Grömer 2012: 46–48; Grömer and Stöllner 2009: 129–134)	
Hallstatt (salt mine)	8th–4th BC		×	×	×	(Grömer and Stöllner 2009; Rösel-Mautendorfer <i>et al.</i> 2010; Grömer 2012: 49)
Denmark						
Skaerso (peat bog)	350 BC–90 AD			×	(Mannering <i>et al.</i> 2012: 113; Vanden Berghe <i>et al.</i> 2009; Norgaard and Ostergaard 1994)	

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**Table S4: (continued)**

Site	Dating	Use and function			Ref.	
		Unspecified	Ribbon	Border		Starting edges
England						
Burton Fleming (inhumation)	La Tène				×	(Crowfoot 1991: 124–125; Wincott Heckett 2012: 437; DeRoche 2012: 447)
Rudston (burial)	La Tène				×	(Crowfoot 1991: 120; DeRoche 2012: 447)
Wetwang Slack (burial 2, inhumation)	La Tène		×			(Crowfoot 1991: 120; Wincott Heckett 2012: 447; DeRoche 2012: 447)
France						
Apremont (inhumation)	600–500 BC		×	×		(Masarel 1992: 66–67)
Mardié (cremation)	525–475 BC			×		(Banck-Burgess 1999: 214)
Germany						
Bescheid	530–500 BC				×	(Banck-Burgess 1999: 199; Grömer and Stöllner 2009: 136–137; Möller-Wiering 2012: 131; Bender Jørgensen 2005: 148)
Damendorf	c. 400 BC	×				(Möller-Wiering 2012: 134)
Eberdingen-Hochdorf (inhumation)	550–500 BC		×	×		(Banck-Burgess 1999: 142–149; Grömer and Stöllner 2009: 137–145)

*Continued on next page.*

**Table S4: (continued)**

Site	Dating	Use and function			Ref.	
		Unspecified	Ribbon	Border		Starting edges
Hohmichele (tumulus I and VI, inhumation)	600–500 BC			×	×	(Riek and H.J. Hundt 1962; Banck-Burgess 1999: 202–203) (Grömer and Stöllner 2009: 147; Möller-Wiering 2012: 131; Bender Jørgensen 2005: 147–148)
Udenheim (burial)	Lt C/D	×				
Greece						
Kerameikos (burial)	447–438 BC			×		(Banck-Burgess 1999: 228)
Italy						
Alfedena (burial)	7th–6th BC			×		(Gleba 2017: figure 8)
Chianciano-Tolle (burial)	7th–6th BC			×		(Gleba 2017: table 1)
Civita Castellana (burial)	7th–6th BC			×		(Gleba 2017: table 1)
Este (burial)	8th–6th BC			×		(Gleba 2017: table 1)
Grotte di Castro Vigna la Piazza (tomba 49, quater D)	8th BC			×		(Gleba and Laurito 2015)
Orvieto, Crocifisso del Tufo (burial)	7th–6th BC			×		(Gleba 2017: table 1)
Ostera dell’Osa (burial)	7th BC			×		(Gleba 2017)
Palestrina (burial)	7th BC			×		(Gleba 2017: table 1)
Poggio Aguzzo di Murlo (burial)	7th BC			×		(Gleba 2017: table 1)

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**Table S4: (continued)**

Site	Dating	Use and function			Ref.
		Unspecified	Ribbon	Border	
Ripacandida (tomba 38)	7th–5th BC			×	(Gleba 2017: 1218)
Santa Palomba (burial)	11th–8th BC			×	(Gleba 2017: table 1)
Sasso di Furbara (burial V)	8th BC			×	(Raeder Knudsen 2012; Mamez and Masurel 1992: 262–263)
Verruchio (tomba del Trono)	700–650 BC			×	(Stauffer 2002; Raeder Knudsen 2012: 229, 247, 256–257)
Verruchio (burial B)	700–650 BC			×	(Grömer and Stöllner 2009: 152)
Vulci (tomba delle Mani d’Argento)	7th BC			×	(Guida <i>et al.</i> 2014)
Luxembourg					
Altrier (cremation)	5th BC			×	(Rast-Eicher <i>et al.</i> 2022)
Poland					
Domasław (burial)	800-400 BC		×		(Maik and Rybarczyk 2015)
Zakrzew (powiat de Sieradz)	800-400 BC	×			(Maik 2005: 227–228)
Scotland					
Leith Hill (inhumation)	800-400 BC			×	(Bender Jørgensen 1992: 198; Wincott Heckett 2012: 438)
Slovenia					

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**Table S4: (continued)**

Site	Dating	Use and function			Ref.
		Unspecified	Ribbon	Border	
Magdalenska Gora (tumulus V, burial 23) (cremation and inhumation)	late Bronze Age—Hallstatt	×			(Banck-Burgess 1999: 222)
Spain					
El Cigarralejo (burial 200, cremation)	400–375 BC			×	(H.-J. Hundt 1968; Alfaro Giner 1984: 119–121, 138–140)
Switzerland					
Matran (tumulus 4, inhumation)	800–650 BC		×		(Mauvilly <i>et al.</i> 2011; Rast-Eicher 2012: 383)

## S5 Definition of weave type

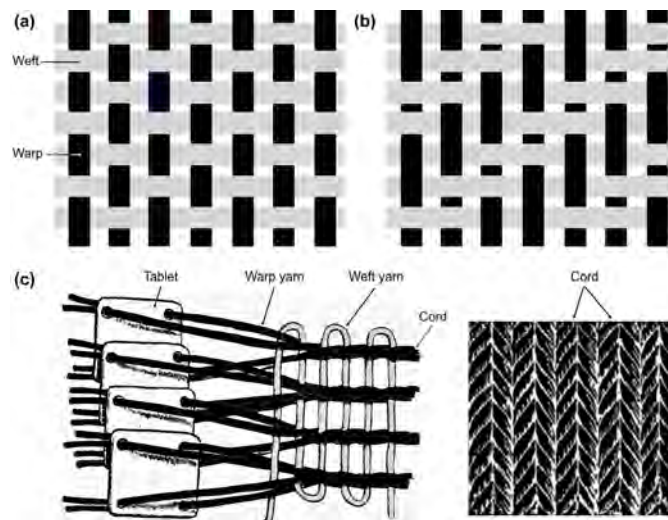


Figure S16: Illustration of the three weave type. (a) Tabby, (b) twill (here 2/2) and (c) tablet-woven. The warp yarns are black and the weft yarns are light grey.



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