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Food production and food procurement in the Bronze Age and Early Iron Age (2000-500 BC)

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5 The botanical material under study: Lorraine region, France⁸

5.1 Aéroport Régional de Lorraine - Liéhon, Louvigny, Goin, Vigny (57)

5.1.1 INTRODUCTION

The site of the regional airport of Lorraine is situated east of the line Metz-Nancy, at a distance of c. 10 kilometres to the east of the present river course of the Moselle. It comprises the communities of Louvigny, Vigny, Goin and Liéhon. The site is situated on the west border of the Plateau Lorrain, at 10 kilometres of the Seille, a small branch of the river Moselle. Its substratum is characterised by large plains of limestone and marls locally covered with löss. Rivers that deposited sand and gravel incise the complex. The borders of the drainage basins of these streams thus define four different topographical units (figure 5.1).

The Aéroport Régional de Lorraine project is one of the largest projects carried out so far by the Service de l'Archéologie de Lorraine (Blouet et al. 1992). Of an area of 250 hectares that was prospected in 1988, a total surface of 23,5 hectares was excavated extensively in 1989 (figure 5.2) (Collectif 1989). For the purpose of this study, a selection of samples was made on the basis of chronological and contextual information. A total number of 47 samples from different features were analysed. The volume for each sample is given in table 5.1.

5.1.2 FEATURES AND SAMPLES

In zone A, an area of 0,3 hectare was excavated. In this zone, the Late Bronze Age and the Hallstatt period are the phases best represented. An occupation phase of Hallstatt B2/C in zone A-west can be demonstrated by the presence of several wells. In this part of the zone, a Hallstatt well was investigated (3 samples).

In zone B, an area of 4 hectares was excavated. In this zone the Néolithique moyen (Michelsberg), Néolithique final (*campaniforme*), Bronze Ancien and Bronze final are represented by an extraordinary continuity of wells. Other traces of human occupation from this period must have been very close, but were not attested. A domestic zone represents the occupation during the Hallstatt C/D period (figure 5.3). A three-aisled building, surrounded by four granaries was attested. Small pits from this same period were found scattered on the excavation terrain. After a relatively long inter-

ruption the terrain was occupied again in the Middle Iron Age. In zone B, the postholes of two Hallstatt granaries were sampled and investigated (8 samples).

In zone C, an area of 5,3 hectares was excavated. Among others, a Neolithic house, a Bronze final I occupation phase with a house, several granaries and a well, and a Bronze final IIa-b phase (a large pit, associated with a building) were recovered. In zone C-west, a Bronze final IIIb-Hallstatt C complex was excavated, composed of a one-aisled building (3104), surrounded by several small pits and silos (figures 5.4 and 5.5). A well (4801) is attributed to the same occupation phase. After a relatively long interruption the terrain was occupied again in the La Tène Moyenne period. In this zone, the postholes of the Late Bronze Age house and a pit or hearth within this building, and the filling of a well from the same period were investigated (16 samples).

In Zone D, an area of 6,3 hectares was excavated. Among others, a Late Neolithic (Michelsberg) occupation phase was found, represented by a silo, and a Bronze Ancien domestic complex, represented by numerous features, like a three-aisled building, comparable to the Early Bronze Age houses in Frouard "ZAC du Saule Gaillard" and Frouard "Haut de Penotte" (54) (see below). A re-occupation of the terrain in the Bronze final I and Bronze final IIb (or transition IIb-IIIa) can be demonstrated. Traces of Hallstatt ancien, La Tène and Roman occupation were also present. In this zone, 12 samples were selected for botanical analysis: the postholes of the Early Bronze Age house, and a small section of the fill of a large, Late Bronze Age pit.

In Zone G, an area of 1,8 hectares was excavated. In addition to numerous Late-Neolithic (*Campaniforme*) silos, a Bronze final IIb-IIIa phase characterised by a large palisade enclosure surrounding a concentration of five or six granaries was attested, among others (figure 5.6). The presence of a palisade of this type is rather exceptional in this period; therefore, the archaeologists suggested ascribing a specific social status to it (Blouet et al. 1992, 186). Some Iron Age and Roman features were recovered as well. In this zone, eight samples from the postholes of two of the Late Bronze Age granaries and one sample from the posthole of a building were selected for analysis. Botanical samples from the zones E and F of this location were not studied.

	B 2153 HaC/D	B 2155 HaC/D	B 2167 HaC/D	B 2169 Ha	B 2171 Ha	B 2173 Ha	B 2174 Ha	B 2444 LaTene	C 3104 BfIIIb/ HaC	C 3107 BfIIIb/ HaC	C 3111 BfIIIb/ HaC
volume (L.)	2	4	0,5	2	3	2	2	3	0,25	0,2	0,5
Camelina sativa	-	-	-	-	-	-	-	-	-	1	-
Cerealia	2f	2f	-	3f	-	5f	1f	7f	-	2	-
Hordeum vulgare (grain)	1	-	-	-	-	-	-	11	-	-	-
Hordeum vulgare vulgare (grain)	-	-	-	-	-	-	-	6	-	-	-
Lens culinaris	1	-	-	-	-	-	-	-	-	-	-
Panicum miliaceum (grain)	-	-	-	-	-	-	-	-	-	-	-
Triticum cf. monococcum (grain)	-	-	-	-	-	-	-	-	-	-	-
Triticum cf. spelta (glume base)	-	-	-	-	-	-	-	-	-	-	-
Triticum dicoccum (glume base)	-	-	-	-	-	-	-	-	-	6	-
Triticum dicoccum (grain)	-	-	-	-	-	-	-	-	-	-	-
Triticum dicoccum/monococcum (glume base)	-	-	-	-	-	-	-	-	-	-	-
Triticum monococcum (glume base)	-	-	-	-	-	-	-	-	-	-	-
Triticum spec. (glume base)	-	-	-	-	-	-	-	-	-	-	-
Triticum spec. (grain)	-	-	-	-	-	-	-	-	-	-	-
Triticum spelta (glume base)	-	-	-	-	-	-	-	-	-	1	-
Triticum/Hordeum (grain)	-	-	-	-	-	-	-	-	-	-	-
Corylus avellana	-	-	-	-	-	-	-	-	-	-	-
Crataegus laevigata	-	-	-	-	-	-	-	-	-	-	-
Atriplex patula/prostrata	1	-	1	-	-	-	-	-	-	-	-
Bromus secalinus-type	-	-	-	-	-	-	-	-	-	1	1cf
Chenopodium album	-	-	-	-	-	-	-	-	-	2	-
Chenopodium hybridum	2	-	-	-	-	-	-	-	-	-	-
Chenopodium spec.	-	-	-	-	-	-	-	-	1	-	-
Fumaria spec.	-	-	-	1	-	-	-	-	-	-	-
Galium aparine	-	-	-	-	-	-	-	-	-	-	-
Galium cf. palustre	1	-	-	-	-	-	-	-	-	-	-
Galium spec.	-	-	-	-	-	-	-	-	-	-	-
Galium spurium	-	-	-	-	-	-	-	-	-	-	-
Gramineae	1	-	-	-	-	-	-	-	-	-	-
Leucanthemum vulgare	-	-	-	-	-	-	-	-	-	1	-
Papaver spec.	-	-	-	-	-	-	-	-	-	-	-
Papilionaceae	-	-	-	-	-	-	4	-	-	3	-
Poa annua/Phleum spec.	-	-	-	-	-	-	-	-	-	-	-
Polygonum aviculare	-	-	-	-	-	-	-	-	-	-	-
Rumex spec.	-	-	-	-	-	-	-	2	-	-	-
Sambucus ebulus	2 ovk	-	-	-	-	-	-	1 vk	-	-	-
Stellaria spec.	-	-	-	-	-	-	-	-	-	-	-
Vicia cf. hirsuta	-	-	-	-	1	-	-	-	-	-	-
Vicia hirsuta	-	-	-	-	-	-	-	-	-	-	-
Vicia spec.	2	-	-	-	-	-	-	-	-	-	-

Table 5.1 List of species. Aéroport Régional de Lorraine

- f or fr = fragment
- cf = tentative identification
- XXX = 100-1000
- ovk = waterlogged
- X = 1-10
- XXXX = more than thousand
- vk = charred
- XX = 10-100
- XXXXX = more than 10.000

C 3112 BfIIIb/ HaC 0,5	C 3113 BfIIIb/ HaC 0,5	C 3118 BfIIIb/ HaC 0,2	C 3121 BfIIIb/ HaC 0,25	C 3122 BfIIIb/ HaC 0,25	C 3124 BfIIIb/ HaC 5,5	D 161 BfIIb 0,5	D 162 EBA 2	D 181 EBA 2	G 8006 BfIIb/ BfIIIa 1	G 8007 BfIIb/ BfIIIa 1	G 8008 BfIIb/ BfIIIa 1	G 8009 BfIIb/ BfIIIa 1	G 8011 BfIIb/ BfIIIa 1	G 8013 BfIIb/ BfIIIa 1
-	-	-	-	-	19	-	-	-	-	-	-	-	-	-
-	-	-	-	-	1	-	-	-	-	-	1	-	-	-
-	1 cf	1	-	-	1cf	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	-	-	-	-	5	-	-	-	-	-	-	-	-	-
-	-	-	-	-	2	-	-	-	-	-	-	1	-	-
-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	2	-	-	-	1	-	-	-	-	-
-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	1	1	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	10	3	-	-	-	-	-	-	-	-
-	-	-	-	-	4	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	8	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	1f	-	1	1	-	-	-	-	-	-
-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	1	-	-	-	3	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	2	-	-	-	-	-	-	-	-	2
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-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
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-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
-	-	-	3f	1	-	1	-	-	-	-	-	-	-	-
-	-	-	-	-	6	-	-	-	-	-	-	-	-	-
-	-	-	-	-	2	1	-	-	-	-	-	-	-	-
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-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	19	-	-	-	-	-	-	-	-	-
-	-	-	-	-	19	-	-	-	-	-	-	-	-	-

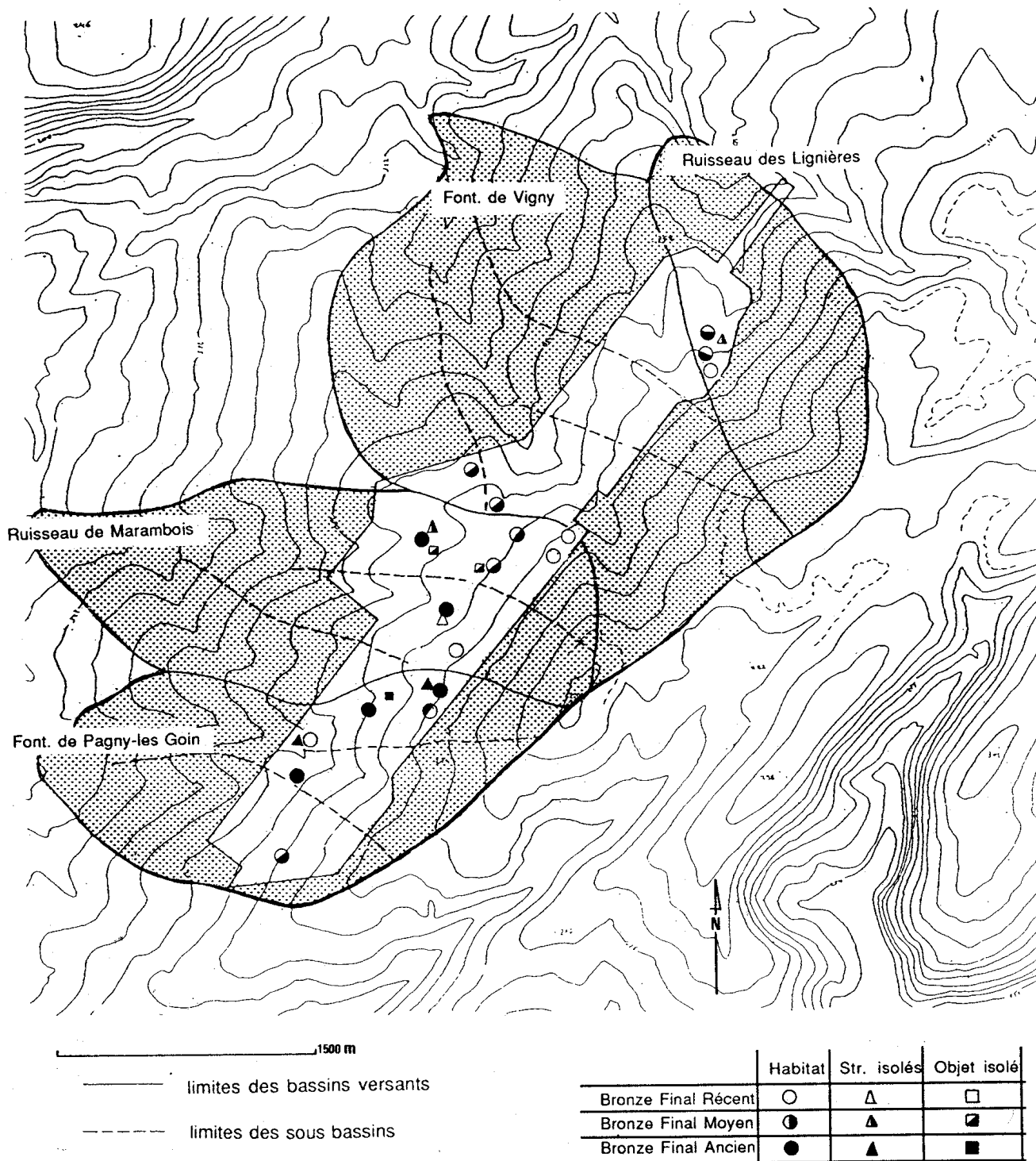


Fig. 5.1 Aéroport Régional de Lorraine. Distribution of Bronze final sites in four different topographical units defined by drainage basins (from Blouet et al. 1992)

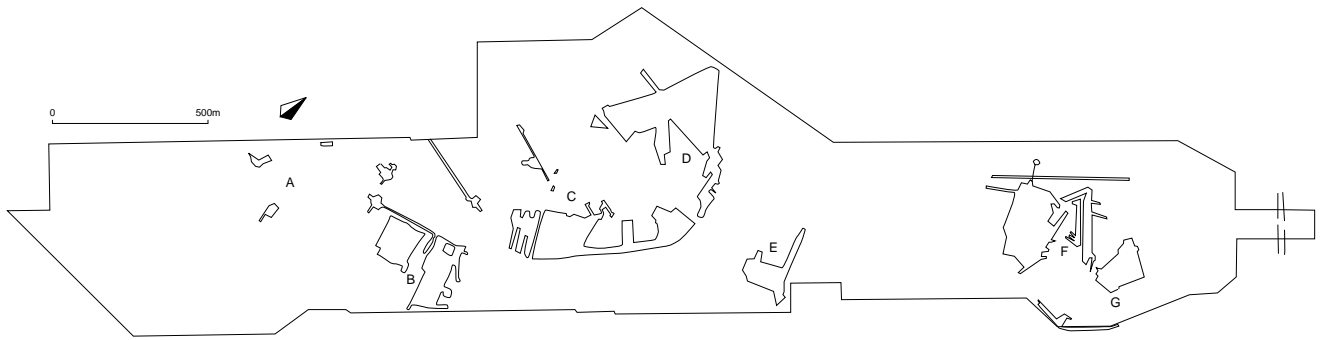


Fig. 5.2 Aéroport Régional de Lorraine. Overview zones A-G

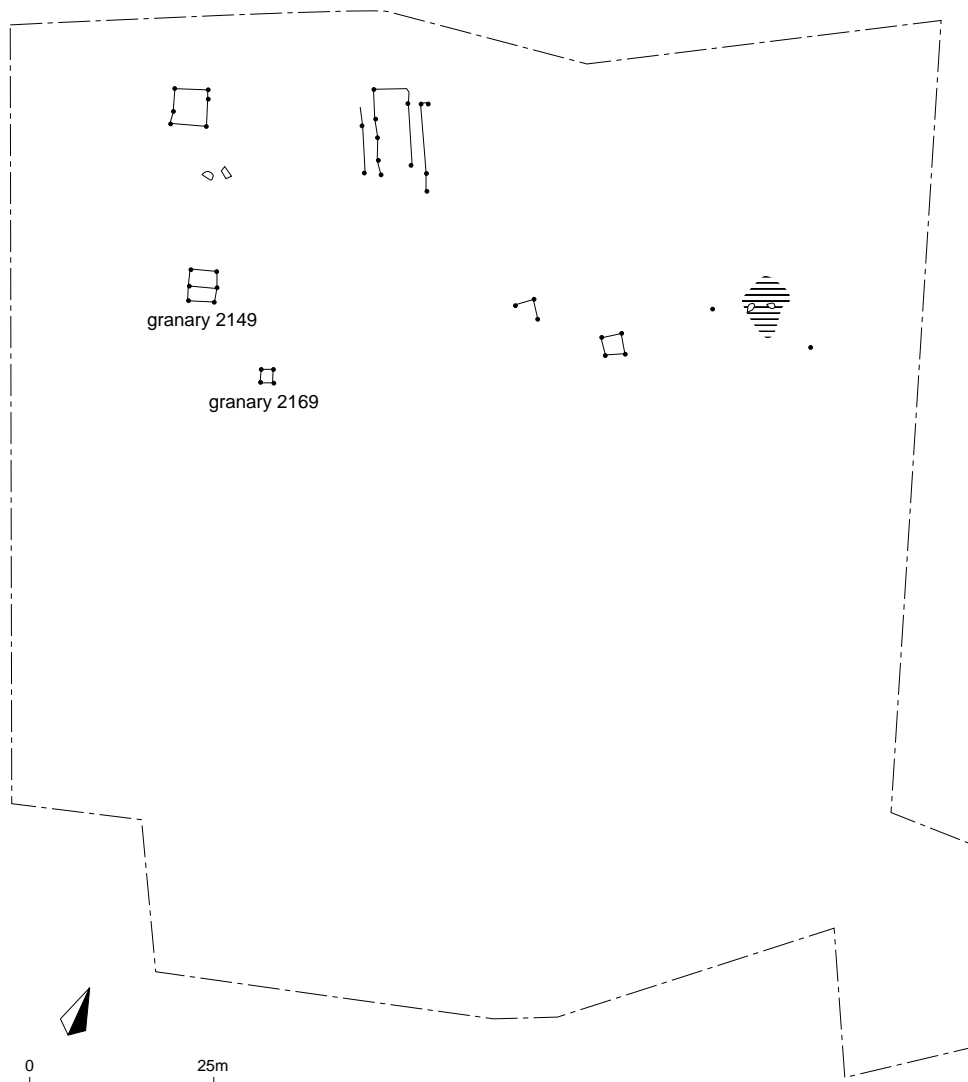


Fig. 5.3 Aéroport Régional de Lorraine, zone B - Hallstatt structures

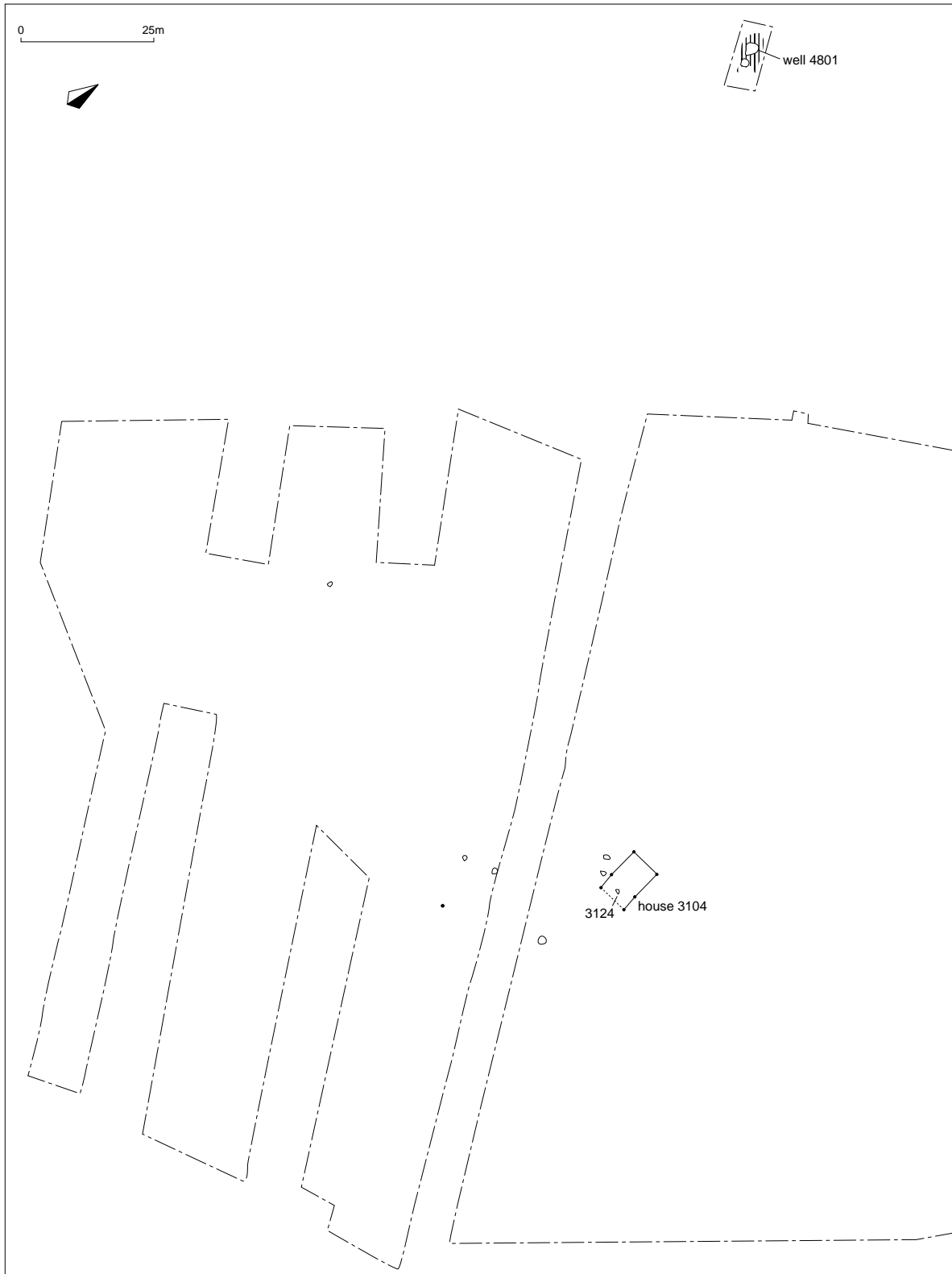


Fig. 5.4 Aéroport Régional de Lorraine, zone C - Bronze final IIIb/Hallstatt C

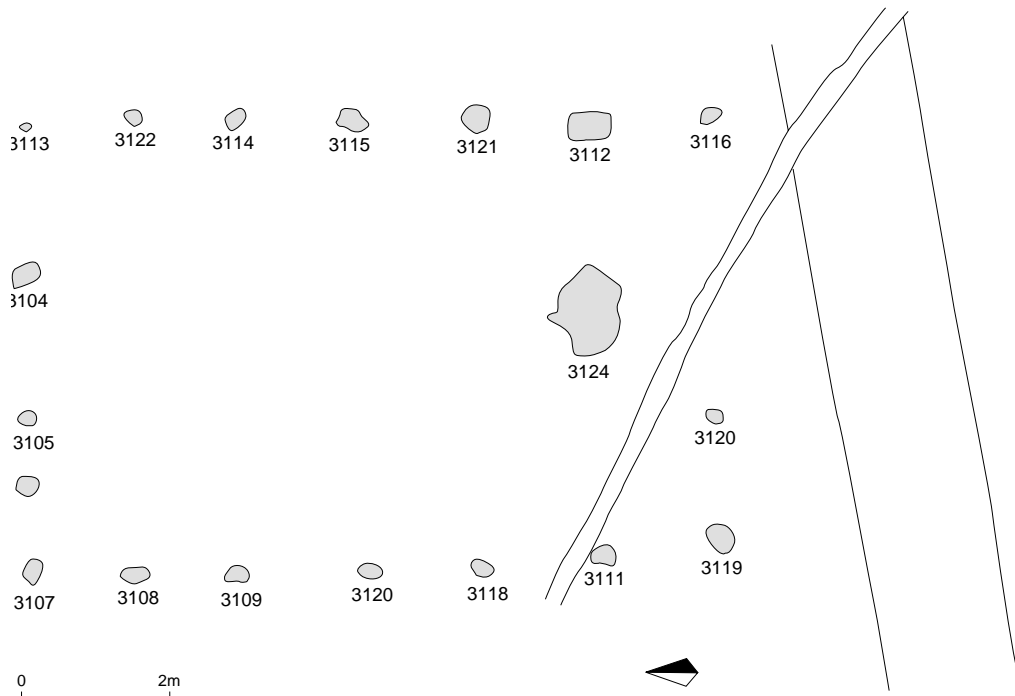


Fig. 5.5 Aéroport Régional de Lorraine, zone C - house 3104

5.1.3 MACRO REMAINS

The analyses of the botanical material were carried out by De Hingh, Kuijper and Goudzwaard. In general, the number of different species from the samples is relatively high, although the samples did not produce very high numbers of seeds.

Zone B: grains of hulled six-row barley and lentil were found in the Hallstatt C/D granaries. Eight different taxa of weeds were recorded.

Zone C: grains of six-row barley and millet, grains and chaff of emmer wheat, possibly einkorn, and spelt wheat, and specimens of lentil and gold-of-pleasure were found in the Late Bronze Age house (Bronze final IIIb-Hallstatt C). Two wild plants that could have been collected, hazelnut (*Corylus avellana*) and hawthorn (*Crataegus laevigata*), were retrieved from the hearth or pit in house 3104. A total number of 14 different taxa of arable weeds were recorded.

Zone D: extremely low numbers of seeds, including some charred fragments of hazelnut, were found in the Early Bronze Age house. The filling of the Late Bronze Age pit (161, Bronze final IIb) yielded a glume base of spelt wheat, probably, and two weed seeds.

Zone G: very small quantities of cereals, emmer wheat and millet, and three different arable weed taxa were found in the fillings of the postholes of the Late Bronze Age (Bronze final IIb-IIIa) granaries.

5.2 Ars-sur-Moselle (57)

5.2.1 INTRODUCTION

The village of Ars-sur-Moselle is located to the southwest of the city of Metz, in the close vicinity of the river Moselle. The site of Ars is situated on the Lower Terrace of the river Moselle of which the sediment is covered with loam. Prior to a building-project in the centre of the old village of Ars-sur-Moselle, 3000 square metres were excavated, under the direction of Jean Marie Blasing. Several protohistoric, Roman and medieval features were discovered (Collectif 1993).

5.2.2 FEATURES

Two Iron Age silos and a pit produced abundant pottery remains and a fibula, attributed to the Hallstatt D3 period. The ceramics are composed entirely of the remains of cooking pottery.

5.2.3 SAMPLES

The bottom layer of the fill of silo 131 was sampled and investigated for botanical remains. The volume of the sample was 4 litres; the soil was sieved through a sieve with meshes of 0,5 mm. The analysis of the botanical material was carried out by the author.

5.2.4 MACRO REMAINS

Extremely low numbers of grains of hulled six-row barley and emmer wheat, among others, were recovered (see table 5.2).

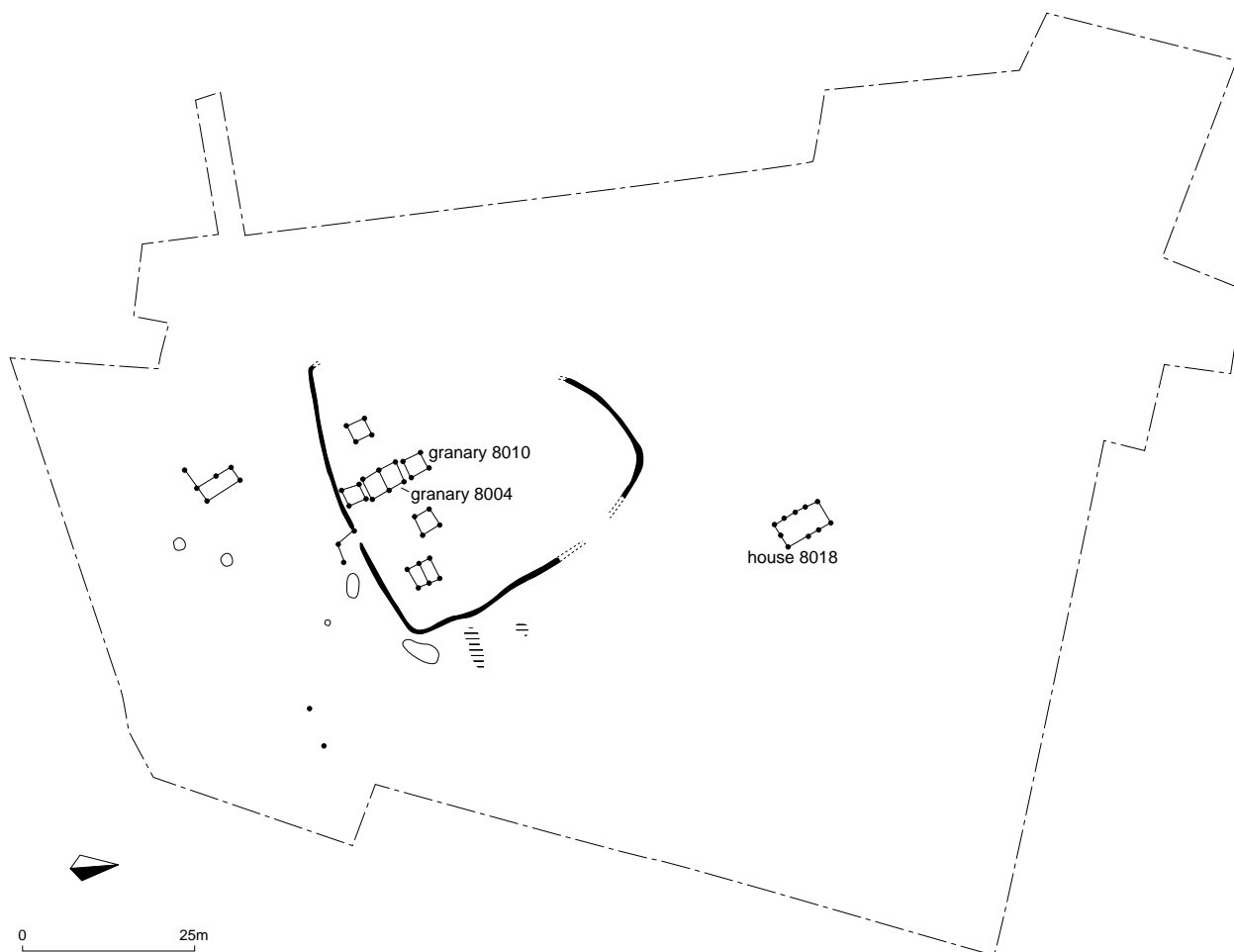


Fig. 5.6 Aéroport Régional de Lorraine, zone G - Bronze final structures

	131
	lowest layer of filling of silo
	HaD3
volume (l)	4
Cerealia	11
Hordeum vulgare vulgare (grain)	2
Triticum dicoccum (grain)	1
Triticum spec. (grain)	1
Chenopodium spec.	1

Table 5.2 List of species. Ars-sur-Moselle

- f or fr = fragment
- cf = tentative identification
- XXX = 100-1000
- ovk = waterlogged
- X = 1-10
- XXXX = more than thousand
- vk = charred
- XX = 10-100
- XXXXX = more than 10.000

5.3 Ay-sur-Moselle (57)

5.3.1 INTRODUCTION

The community of Ay-sur-Moselle is located halfway between the towns of Metz and Thionville, in the Moselle

valley, 1 kilometre east of the present river course. The site is situated in an area that was very intensively investigated (see below: Ennery, Trémery and Flévy). Its subsurface is covered with sandy loam. The excavation was carried out by the Service Régional de l'Archéologie de Lorraine under the direction of O. Faye and L. Thomashausen (Collectif 1992, 42). The total surface of the excavations was 7000 m².

5.3.2 SAMPLES

From the site of Ay-sur-Moselle, five samples from the Bronze final IIIa-b silos 10, 45, 356, 362 and 449 were investigated. The analyses were carried out by W. Kuijper and the author. The volume of each sample is listed in table 5.3.

5.3.3 MACRO REMAINS

The presence of only one cultivated species could be attested with certainty, i.e. of emmer wheat (*Triticum dicoccum*). Large quantities of chaff remains of this species were found.

	10 layer 1 silo HaB1?	45 silo HaB1?	356 silo HaB1?	362 silo HaB1?	449 silo HaB1?
volume (l.)	2	4	6	2	2
Cerealia	3	3	-	-	-
Triticum dicoccum (glume base)	7	-	462	96	-
Triticum dicoccum (grain)	-	-	79	4	-
Triticum monococcum (grain)	-	1 cf	-	-	-
Triticum spec. (glume base)	-	11	-	-	2
Triticum spec. (grain)	-	-	-	8	7
Corylus avellana	-	-	-	1	-
Bromus secalinus-type	-	-	85	5	-
Bromus spec.	-	-	603	-	-
Bromus sterilis/tectorum	2	-	67	-	-
Chenopodium album	3	-	3	3	2
Fallopia convolvulus	2	-	179	1	-
Galium aparine	-	-	2	-	-
Galium spec.	-	-	3	-	-
Lapsana communis	1	-	148	-	-
Papilionaceae	1	-	-	-	-
Persicaria lapathifolium	-	-	1	-	-
Plantago major	-	-	1	-	-
Poa annua/Phleum spec.	-	-	-	1	-
Rumex acetosella	-	-	13	-	-
Rumex spec.	1	-	-	-	-
Stachys arvensis	-	-	2cf	-	-
Vicia hirsuta	-	-	1	-	-

Table 5.3 List of species. Ay-sur-Moselle

- f or fr = fragment
- cf = tentative identification
- XXX = 100-1000
- ovk = waterlogged
- X = 1-10
- XXXX = more than thousand
- vk = charred
- XX = 10-100
- XXXXX = more than 10.000

The identification of einkorn (*Triticum cf. monococcum*) is uncertain. A single fragment of hazelnut (*Corylus avellana*) was found and 16 different taxa of arable weeds, among which various *Bromus* species, *Lapsana communis* and *Fallopia convolvulus*.

5.4 Basse Ham (57)

5.4.1 INTRODUCTION

The excavation in the village of Basse Ham, in the neighbourhood called “Mittelhaid” was carried out by the Service Régional de l’Archéologie de Lorraine, under the direction of Christelle Faye. It is situated on the location of the *Zone Artisanale et Commerciale* of Thionville Nord Est, at 500 metres from the present agglomeration. In the site concerned ancient alluviums are covered with sandy loam with an average thickness of 0,5 m. In 1989, the first archaeological features were discovered during prospective investigations

and in 1992, archaeological excavations of an area of 2,5 hectares took place (Blouet et al. 1993).

5.4.2 FEATURES

The earliest occupation on the site of Basse-Ham is dated in the Chalcolithic (*Campaniforme moyen*), represented by several pits. It is expected that the silos on the terrain can also be attributed to this early period. C14-dating must confirm this hypothesis, as a Late Bronze Age IIIb/Hallstatt origin is regarded as an alternative possibility. The Bronze final period is best represented at this site, esp. the *phase moyenne* (1100-900 BC).

5.4.3 SAMPLES

Nine soil samples from four different Chalcolithic silos (structures 35, 36, 180 and 251, see figure 5.7) with a total volume of 31 litres were investigated for macro remains. The

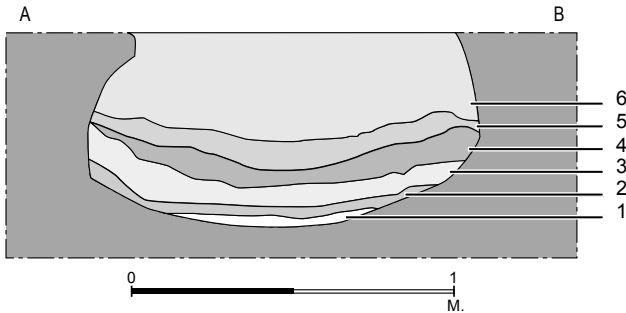
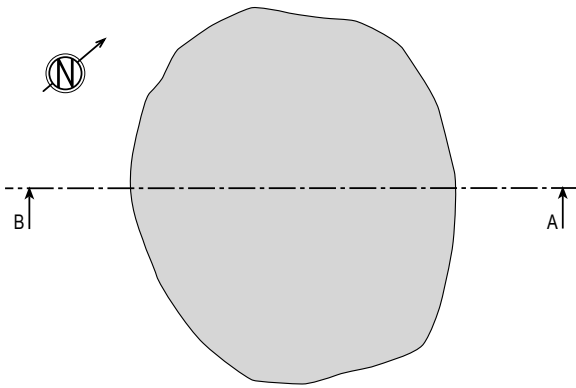


Fig. 5.7 Basse Ham. Structure 251, silo

analyses were carried out by J. Goudzwaard, W. Kuijper and the author. Six samples did not yield any botanical remains. The analysis of the remaining three samples (36-3, 251-2 and 251-3) produced very small numbers of seeds (see table 5.4).

	36	251	251
layer	3	2	3
volume (L.)	Campaniforme 2	Campaniforme 2	Campaniforme 7
Triticum dicoccum (grain)	1cf	2cf	-
Corylus avellana	-	1	-
Chenopodium album	-	-	2
Iris pseudacorus	-	-	1
Rumex spec.	-	-	2

Table 5.4 List of species. Basse Ham "Mittelhaid"

- f or fr = fragment
- ovk = waterlogged
- vk = charred
- cf = tentative identification
- X = 1-10
- XX = 10-100
- XXX = 100-1000
- XXXX = more than thousand
- XXXXX = more than 10.000

5.4.4 MACRO REMAINS

Low numbers of grains of emmer wheat (*Triticum dicoccum*) were found, although the identifications remain tentative. Hazelnut (*Corylus avellana*) was attested with one fragment. Very low numbers of three different weed species were found.

5.5 Betting (57)

5.5.1 INTRODUCTION

The excavation in Betting-lès-Saint-Avold, situated in the industrial zone of this community at the neighbourhood of "Galgenberg", was carried out by the Service Régional de l'Archéologie de Lorraine, under the direction of Olivier Faye. The site is located to the northeast of the town of Thionville, very close to the German border. The geological context is composed of sand stone layers covered with sandy loam. After a prospective campaign the decision was taken to excavate a surface of c. 2000 m² in 1993 (Faye 1993).

5.5.2 FEATURES

The archaeological investigations on the location of Betting revealed, among other things, several habitation structures of the end of the Early Iron Age (*Hallstatt final*) or of the beginning of the Later Iron Age (*La Tène ancienne*).

5.5.3 SAMPLES

In sector 1, a single sample was collected from silo 1, a structure with a circular lay-out and a diametre of 1,6 metre, comparable to the many silos known from this period in Lorraine. Pottery is dated to the end of the Early Iron Age (*Hallstatt final*) or the beginning of the Later Iron Age (*La Tène ancienne*). The analysis was carried out by the author. The volume of the sample is unknown (see table 5.5).

feature	1
	filling of silo
	Ha final/LT anc.
volume (l.)	unknown
Hordeum vulgare (grain)	50
Hordeum vulgare vulgare (grain)	45
Triticum spelta (grain)	21
Triticum/Hordeum (grain)	40
Avena spec.	4
Vicia spec.	1

Table 5.5 List of species. Betting "Galgenberg"

- f or fr = fragment
- cf = tentative identification
- XXX = 100-1000
- ovk = waterlogged
- X = 1-10
- XXXXX = more than thousand
- vk = charred
- XX = 10-100
- XXXXX = more than 10.000

5.5.4 MACRO REMAINS

Relatively large numbers of plant remains were recovered from the sample. The assemblage consisted of hundreds of cereal grains dominated by those of six-row barley (*Hordeum vulgare*), 50% of which could be ascribed to the hulled variety. Also, grains of spelt wheat (*Triticum spelta*) were found. Some arable weeds (*Avena spec.* and *Vicia spec.*) were present.

5.5.5 REMARKS ON THE IDENTIFICATION

The poor preservation of the botanical material complicated the identification. The grains that are identified as *Triticum/ Hordeum* could possibly partially belong to spelt wheat, but the identification of these grains remained problematic. The barley grains probably all belong to the hulled variety, but only half of the assemblage can be identified as such with certainty.

5.6 Crévéchamps "Tronc du Chêne" (54)

5.6.1 INTRODUCTION

The site of Crévéchamps "Tronc du Chêne" is situated in the department of Meurthe-et-Moselle, at 15 kilometres south of the town of Nancy. It is located in the river valley at circa 600 metres from the present course of the river Moselle. In the valley we find sandy gravel with a thickness of 5 to 7 metres, covered by loam with a thickness of 0,5 to 1,50 metres. The slope in the valley is 1,2 %. Archaeological rescue investigations were carried out on this site over a surface of 7 hectares because of the extensions of the sandpit *GSM Est*. It was excavated in three successive campaigns, zone B and C in 1991 (Buzzi/Koenig 1992), zone A in 1992 (Buzzi/Koenig 1995) and zone D, E and F in 1993/1994 (Koenig et al. 1997) under the direction of Marie-Pierre Koenig, archaeologist of the Service Régional de l'Archéologie de Lorraine (figure 5.8).



Fig. 5.8 Crévéchamps. Overview zones A-C

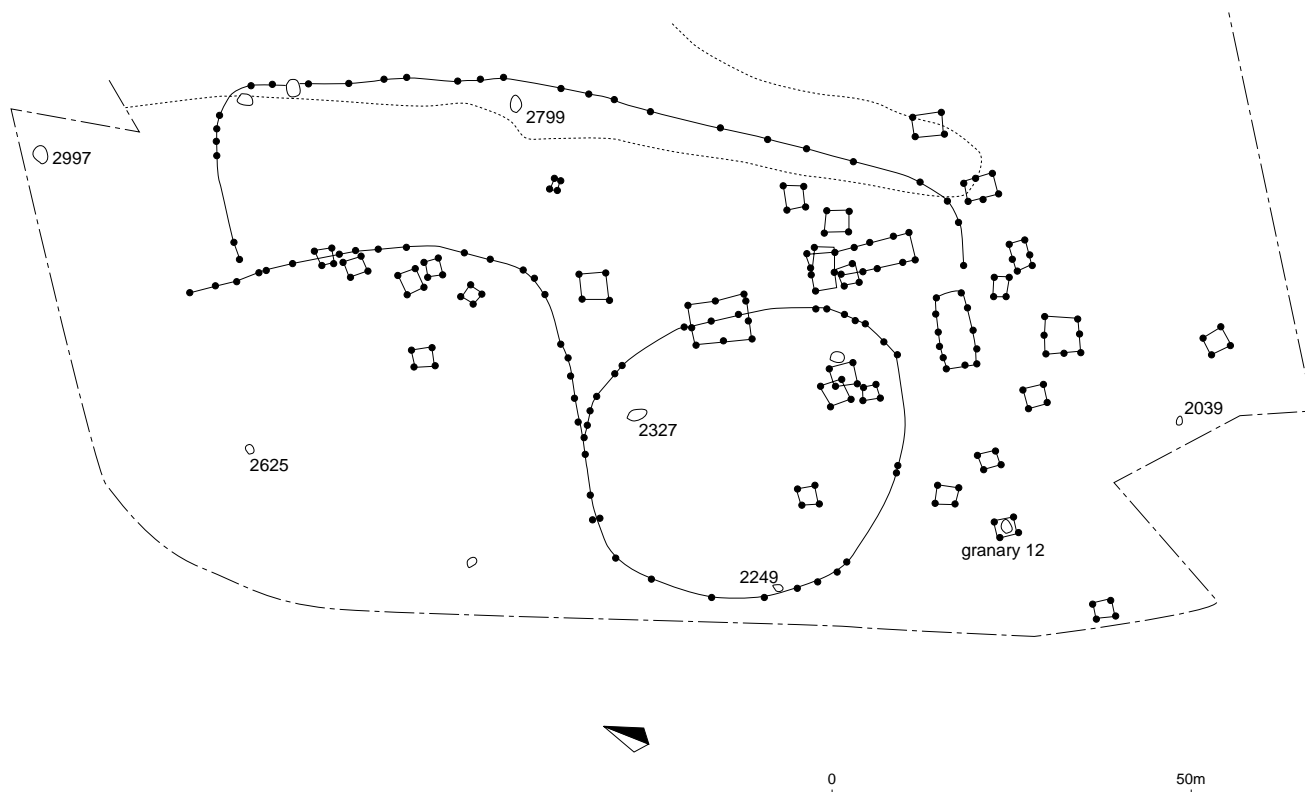


Fig. 5.9 Crévéchamps zone B - south part

During the first prospective investigations, settlement sites of the Middle Bronze Age (1500-1250 BC) and Early Iron Age (750-450 BC), located along an old arm of the Moselle (in zones B and C), an Early Iron Age settlement site (in zones A and F), and a number of various other (gallo-roman) features were uncovered.

5.6.2 FEATURES

In total, around 1000 different features were excavated in the site of Crévéchamps. For the purpose of this study, the remains from the archaeological structures in the zones A, B (together with C) and D are significant.

Zone B, together with zone C, covers a surface of c. 5 hectares (figure 5.9). It was prospected in 1989, and excavated two years later. This delay was not advantageous to the quality and the conservation of the archaeological features. Much information with regard to c. hundred especially shallow features was lost. In this zone, occupation phases of the Neolithic, the Middle Bronze Age and the Early Iron Age were attested. A number of pits, like 2799, follow the palisade of a palaeo-channel, which is supposed to have been in use during the Middle Bronze Age. Large numbers of granaries were discovered, the majority of which are dated in the Hallstatt period. Houses 1 and 2 are also attrib-

uted to this period. House 3 was occupied in the Neolithic (figures 5.9, 5.10, 5.11 and 5.12).

Zone A is located north of zone B and C. In 1989 prospective investigations were carried out on zone A and F. During two campaigns, in 1989 and only again in 1992, zone A was totally excavated (2,6 hectares) (figure 5.13). Here also, the great time lapse between the two campaigns caused problems tracing the features back and damaged the quality of the features. An occupation phase of the Early Iron Age (750-450 BC) was established, which corresponds to the contemporaneous occupation in zone B and C. This offered the opportunity to define the extent of this Early Iron Age settlement. During the beginning of the Early Iron Age (Hallstatt C) a first human occupation is attested. It is composed of a small habitation unity of eight buildings (houses, granaries and other buildings) and three pits (1051, 1053 and 1063). This occupation phase lasted approximately 125 years (725-600 BC) (Buzzi/Koenig 1995, 159). A second concentration consists mainly of a number of small buildings and pits (among others 1100, 1186, 1188, 1190, 1194, 1284, and 1299). The pits 1198, 1201, 1203, 1205 and 1206 belong to a third group of structures.

In the course of 1993 and 1994 zones D, E and F were excavated. The archaeological analysis of these investigations is still in preparation (Koenig (ed.) in prep).

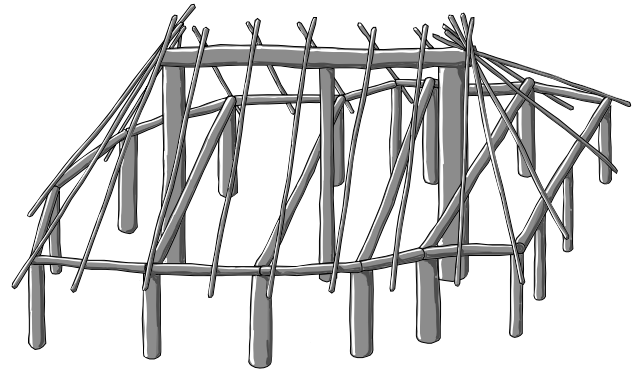
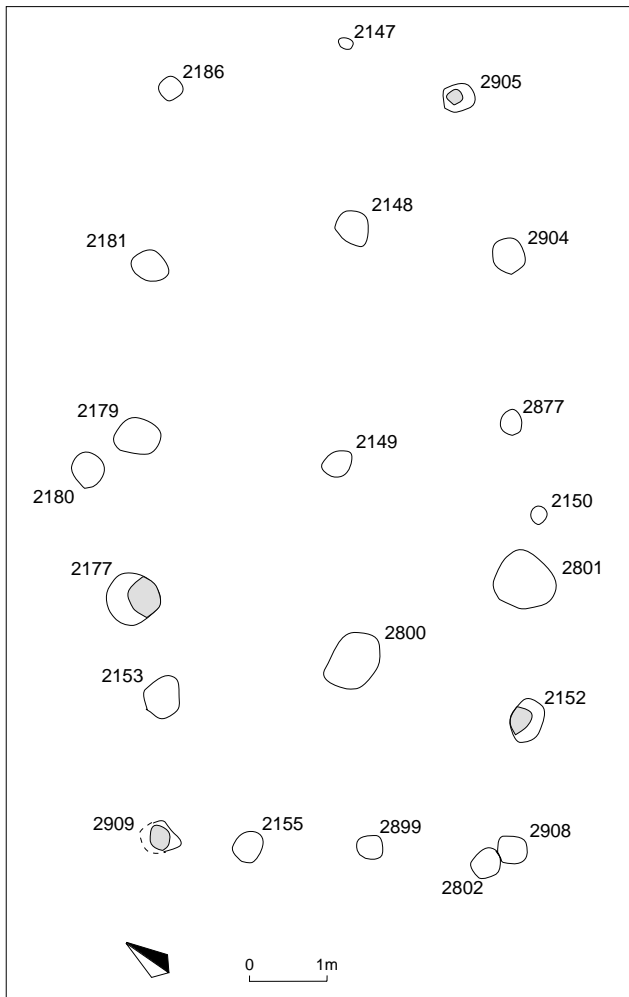


Fig. 5.10 Crévéchamps zone B - House 1 (Hallstatt) and reconstruction

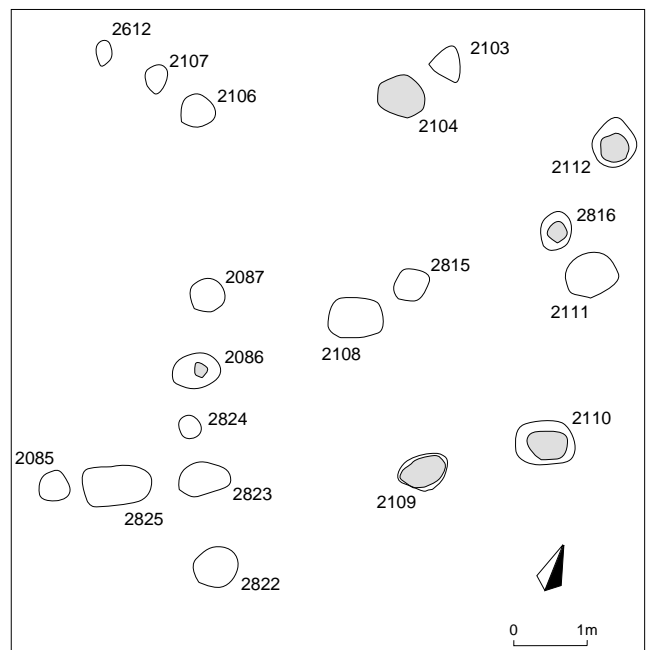


Fig. 5.11 Crévéchamps zone B - House 2

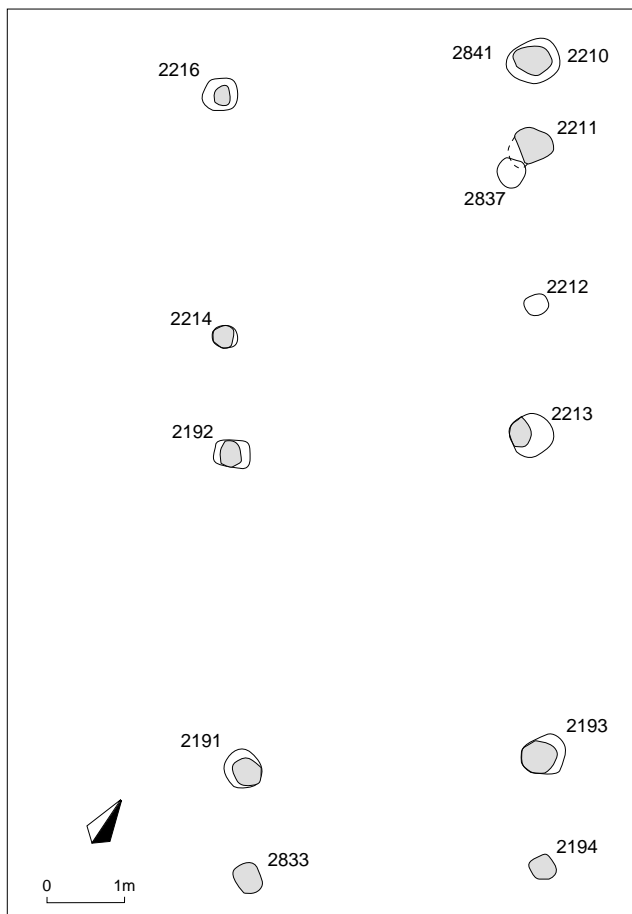


Fig. 5.12 Crévéchamps zone B - House 3

5.6.3 SAMPLES

A total number of 224 soil samples from the site of Crévéchamps “Tronc du Chêne” were analysed by the author, J. Goudzwaard and V. Mattered (see table 5.6). In zone A a total number of 57 samples from the buildings 1, 2, 3, 4, 5, 7 and 8, seven (vase-)silos, five pits of various nature (all from approximately the same period: Hallstatt C-D) and a so-called “Polynesian” oven (dated: 1300-1100 BC) were investigated.

In zone B a total number of 97 samples were investigated from the Hallstatt houses 1 and 2, the Neolithic house 3, five Hallstatt granaries (1, 8, 13, 17, 23) and an Early Bronze Age granary (12). Furthermore, samples were examined from four (vase-) silos of which one was probably dated in the Middle Bronze Age, a Bronze final oven (dated 1267-923 BC), one pit probably dating from the Early Bronze Age, and a sample from a section of the palaeo-channel were investigated.

In zone D a total number of 70 samples from the Hallstatt buildings 15, 16, 18, 27 and 30 (figure 5.14), two undatable buildings (22 and 23), two pits and two silos (from the Hallstatt C period and the Bronze Ancien respectively) were investigated.

5.6.4 MACRO REMAINS

Zone A: 31 out of 57 samples yielded plant remains, mostly in small quantities. Several crops were found in the Early Iron Age structures, such as barley, millet and pea. A mixture of emmer wheat and spelt wheat dominates the sample from the oven 1064 (1300-1100 BC). A fragment of hazel-

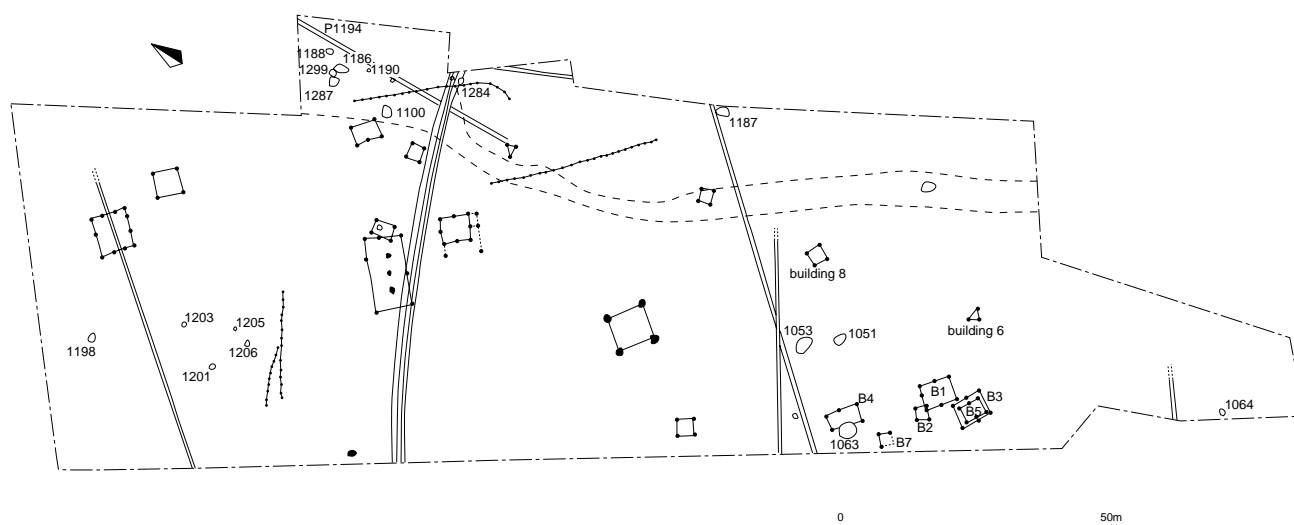


Fig. 5.13 Crévéchamps zone A - overview excavation 1992

	A 1053 1 HaC	A 1064 all layers LBA	A 1100 1 HaC/D	A 1100 2 HaC/D	A 1100 3 HaC/D	A 1186 1 Iron Age	A 1187 1 Iron Age	A 1187 2 Iron Age	A 1203 1 proto	A 1203 3 proto	A 1205 1 proto	A 1000 Ha	A 1005 Ha
volume (L.)	5	13,5	6,5	4	7,5	6	5	5,5	8	8	4	4	6
Cerealia	-	-	-	3	-	-	-	1	-	11	2	-	5
Hordeum vulgare (grain)	-	-	1	-	-	-	1 cf	-	-	-	-	-	-
Hordeum vulgare nudum (grain)	-	-	-	-	-	-	-	-	-	-	-	-	-
Hordeum vulgare vulgare (grain)	-	1	-	-	-	-	-	-	-	-	-	-	-
Hordeum/Triticum (grain)	-	-	-	-	-	-	-	-	1	-	-	-	-
Panicum miliaceum (grain)	-	-	-	-	-	-	-	-	-	1	-	-	-
Papilionaceae (Vicia, Lens)	-	-	-	-	-	-	-	-	-	-	-	-	-
Pisum sativum	-	1	-	-	-	-	-	-	-	-	-	-	-
Triticum aestivum (grain)	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum aestivum (rachis internode)	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum dicoccum (glume base)	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum dicoccum (grain)	1 cf	-	-	-	-	-	-	-	-	-	-	-	-
Triticum dicoccum/spelta (base)	-	xxxx	-	-	-	-	-	-	-	-	-	-	-
Triticum dicoccum/spelta (grain)	-	xxxx	-	-	-	-	-	-	-	-	-	-	-
Triticum monococcum (rachis internode)	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum spec. (glume base)	-	-	-	-	-	-	-	-	-	1	-	-	-
Triticum spec. (grain)	-	-	-	-	-	1	-	-	-	1 cf	-	-	-
Triticum spelta (glume base)	-	-	-	-	-	1 cf	-	-	-	1	-	-	-
Triticum spelta (grain)	-	-	-	-	-	-	-	-	-	-	-	-	-
Corylus avellana	-	-	-	-	-	-	-	-	-	1	-	-	-
Vitis cf. vinifera	-	-	-	-	-	-	-	-	-	-	-	-	-
Atriplex spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Avena spec. (awn)	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromus spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromus sterilis/tectorum	-	-	-	-	-	-	-	-	-	-	-	-	-
Carex spec.	-	-	-	-	-	-	-	-	-	11	-	-	-
Chenopodiaceae	-	-	-	-	-	-	-	-	-	-	-	-	-
Chenopodium album	-	11	-	-	-	-	-	1	-	-	-	2	-
Chenopodium spec.	-	4	-	-	-	-	-	-	-	1	-	-	-
Fallopia convolvulus	-	57	-	-	-	-	-	-	-	-	-	-	-
Fumaria officinalis	-	-	-	-	-	-	-	-	-	13	-	-	-
Galium aparine	-	-	-	-	-	-	-	-	-	1	-	-	-
Galium spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Galium spurium	-	-	-	-	-	-	-	-	-	1	-	-	-
Lapsana communis	-	1	-	-	-	-	-	-	-	-	-	-	-
Odontites spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Papaver setigerum	-	-	-	-	-	-	-	-	-	-	-	-	-
Papaver spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Persicaria lapathifolium	-	-	-	-	-	-	-	-	-	-	2	-	-
Plantago lanceolata	-	-	-	-	-	-	-	-	-	-	-	1	-
Poa-type	-	1	-	-	-	-	-	-	-	-	-	-	-
Polygonum aviculare	-	-	-	-	1	-	-	-	-	-	-	-	-
Polygonum spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Sambucus ebulus	-	-	2	-	2	9	-	-	-	68	-	-	-
Sambucus spec.	-	-	-	-	2	-	-	-	-	-	1	-	-
Setaria spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Solanum nigrum	-	-	-	-	-	-	-	-	-	-	-	-	-
Solanum spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Sonchus asper	-	-	-	-	-	-	-	-	-	1	-	-	-
Stachys arvensis	-	-	-	-	-	-	-	-	-	10	-	-	-
Umbelliferae	-	-	-	-	-	-	-	-	-	2	-	-	-
Vicia hirsuta	-	-	-	-	-	-	-	-	-	2 cf	-	-	-
Vicia spec.	-	1	1	-	-	-	1	-	-	-	-	-	-
Vicia tetrasperma	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 5.6. List of species Crévéchamps "Tronc du Chêne"

	A 1013	A 1015	A 1016	A 1017	A 1028	A 1029	A 1030	A 1046	A 1047	A 1049	B 2065	B 2327	B 2587
	HaC	HaC	HaC	HaC	HaC	HaC	HaC	HaC/D	HaC/D	HaC/D	EBA?	LBA	?
volume (L.)	2,5	5	5	5	4,5	2,5	3,5	3,5	4,5	4	5	2	2
Cerealia	2	1	1	1	5	2	-	5	20	6	-	1	-
Hordeum vulgare (grain)	-	-	1	-	-	-	-	-	1	-	-	-	1
Hordeum vulgare nudum (grain)	-	-	-	-	-	-	-	-	-	-	-	-	-
Hordeum vulgare vulgare (grain)	-	-	-	-	-	-	-	-	-	-	-	-	-
Hordeum/Triticum (grain)	1	-	2	-	4	-	-	-	2	-	1	2	-
Panicum miliaceum (grain)	-	-	-	-	-	-	-	-	1	1	-	-	-
Papilionaceae (Vicia, Lens)	-	-	-	-	-	-	-	-	-	-	-	-	-
Pisum sativum	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum aestivum (grain)	-	-	-	-	-	-	-	-	7 cf	-	-	-	-
Triticum aestivum (rachis internode)	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum dicoccum (glume base)	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum dicoccum (grain)	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum dicoccum/spelta (base)	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum dicoccum/spelta (grain)	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum monococcum (rachis internode)	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum spec. (glume base)	-	-	-	-	-	-	-	1 cf	3	-	1 cf	-	-
Triticum spec. (grain)	-	-	-	-	1	-	-	-	-	-	-	-	-
Triticum spelta (glume base)	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum spelta (grain)	-	-	-	-	-	-	-	-	-	-	-	-	-
Corylus avellana	-	-	-	-	-	-	-	-	-	-	-	-	-
Vitis cf. vinifera	-	-	-	-	-	-	-	-	-	-	-	-	-
Atriplex spec.	-	-	-	-	-	-	-	-	-	-	-	-	1
Avena spec. (awn)	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromus spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromus sterilis/tectorum	-	-	-	-	-	-	-	-	-	-	-	-	-
Carex spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Chenopodiaceae	-	-	-	-	-	-	-	-	-	-	-	-	-
Chenopodium album	-	-	-	1	-	-	1	-	-	-	-	-	-
Chenopodium spec.	-	-	-	-	-	-	-	1	-	-	-	-	-
Fallopia convolvulus	-	-	-	-	-	-	-	-	-	-	-	-	-
Fumaria officinalis	-	-	-	-	-	-	-	-	-	-	-	-	-
Galium aparine	-	-	-	-	2	-	-	-	-	-	-	-	-
Galium spec.	-	-	-	-	1	-	-	-	-	-	-	-	-
Galium spurium	-	-	-	-	-	-	-	-	-	-	-	-	-
Lapsana communis	-	-	-	-	-	-	-	-	-	-	-	-	-
Odontites spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Papaver setigerum	-	-	-	-	-	-	-	-	-	-	-	-	-
Papaver spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Persicaria lapathifolium	-	-	-	-	-	-	-	-	-	-	-	-	-
Plantago lanceolata	-	-	-	-	-	-	-	-	-	-	-	-	-
Poa-type	-	-	-	-	-	-	-	-	-	-	-	-	-
Polygonum aviculare	-	-	-	-	-	-	-	-	-	-	-	-	-
Polygonum spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Sambucus ebulus	-	-	-	-	-	-	-	-	2	-	-	-	-
Sambucus spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Setaria spec.	-	-	-	-	1 cf	-	-	-	-	-	-	-	-
Solanum nigrum	-	-	-	-	-	-	-	-	-	-	-	-	-
Solanum spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Sonchus asper	-	-	-	-	-	-	-	-	-	-	-	-	-
Stachys arvensis	-	-	-	-	-	-	-	-	-	-	-	-	-
Umbelliferae	-	-	-	-	-	-	-	-	-	-	-	-	-
Vicia hirsuta	-	-	-	-	-	-	-	-	-	-	-	-	-
Vicia spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Vicia tetrasperma	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 5.6. continued

	B 2625	B 2907	B 2907	B AZ 121	B 2149	B 2800	B 2909	B 2087	B 2108	B 2110	B 2211	B 2841	B 2082
	MBA?	pit ?	bottom ?	MBA	Ha	Ha	Ha	Ha	Ha	Ha	LNeo	LNeo	Ha
volume (L.)	1,5	6	3	9,5	4,5	4,5	3	1	2	2	2	2,5	3
Cerealia	-	4	11	-	3 f	-	4	-	2	1	7	3	2
Hordeum vulgare (grain)	15	-	-	-	-	1	-	-	-	-	-	-	1 cf.
Hordeum vulgare nudum (grain)	71	-	-	-	-	-	-	-	-	-	-	-	-
Hordeum vulgare vulgare (grain)	231	-	-	-	-	-	-	-	-	-	-	-	-
Hordeum/Triticum (grain)	-	-	-	11	-	4	-	-	-	-	-	-	-
Panicum miliaceum (grain)	-	-	-	-	-	1	-	-	-	-	-	-	-
Papilionaceae (Vicia, Lens)	-	-	-	-	-	-	-	-	-	-	-	-	-
Pisum sativum	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum aestivum (grain)	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum aestivum (rachis internode)	8	-	-	-	-	-	-	-	-	-	-	-	-
Triticum dicoccum (glume base)	4	-	-	-	-	-	-	-	-	-	-	-	-
Triticum dicoccum (grain)	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum dicoccum/spelta (base)	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum dicoccum/spelta (grain)	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum monococcum (rachis internode)	1	-	-	-	-	-	-	-	-	-	-	-	-
Triticum spec. (glume base)	24	-	-	-	1	-	-	-	-	-	-	-	-
Triticum spec. (grain)	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum spelta (glume base)	28	-	-	8 cf	-	-	-	-	-	-	-	-	-
Triticum spelta (grain)	-	-	-	-	-	-	-	-	-	-	-	-	-
Corylus avellana	-	-	-	3	-	-	-	-	-	-	-	-	-
Vitis cf. vinifera	-	-	-	-	-	-	-	1	-	-	-	-	-
Atriplex spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Avena spec. (awn)	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromus spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromus sterilis/tectorum	-	-	-	-	-	-	-	-	-	-	-	-	-
Carex spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Chenopodiaceae	-	-	-	-	-	-	-	-	-	-	-	-	-
Chenopodium album	-	-	-	-	-	1	-	-	-	-	-	-	-
Chenopodium spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Fallopia convolvulus	-	-	-	-	-	-	-	-	-	-	-	-	-
Fumaria officinalis	-	-	-	-	-	-	-	-	-	-	-	-	-
Galium aparine	-	-	-	-	-	-	-	-	-	-	-	-	-
Galium spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Galium spurium	-	-	-	-	-	-	-	-	-	-	-	-	-
Lapsana communis	-	-	-	-	-	-	-	-	-	-	-	-	-
Odontites spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Papaver setigerum	-	-	-	-	-	-	-	-	-	-	-	-	-
Papaver spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Persicaria lapathifolium	-	-	-	-	-	-	-	-	-	-	-	-	-
Plantago lanceolata	-	-	-	-	-	-	-	-	-	-	-	-	-
Poa-type	-	-	-	-	-	-	-	-	-	-	-	-	-
Polygonum aviculare	-	-	-	-	-	-	-	-	-	-	-	-	-
Polygonum spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Sambucus ebulus	-	-	-	-	-	-	-	-	-	-	-	-	-
Sambucus spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Setaria spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Solanum nigrum	-	-	-	-	-	-	-	-	-	-	-	-	-
Solanum spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Sonchus asper	-	-	-	-	-	-	-	-	-	-	-	-	-
Stachys arvensis	-	-	-	-	-	-	-	-	-	-	-	-	-
Umbelliferae	-	-	-	-	-	-	-	-	-	-	-	-	-
Vicia hirsuta	-	-	-	-	-	-	-	-	-	-	-	-	-
Vicia spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Vicia tetrasperma	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 5.6. continued

	B 2093	B 2094	B 2227	B 2232	B 2261	B 2063	B 2066	B 2067	B 2164	B 2846	B 2253	B 2254	B 2255
	Ha	Ha	Ha	Ha	Ha	EBA	EBA	EBA	EBA	EBA	Ha	Ha	Ha
volume (L.)	3	12	4,5	4,5	4,5	3	3	5	3	3	6	4	6
Cerealia	-	1	xx	xxx	9	2	4	2	-	-	1	4	-
Hordeum vulgare (grain)	-	-	-	-	2	-	1 cf.	1 cf.	-	-	-	-	-
Hordeum vulgare nudum (grain)	-	-	-	-	-	-	-	-	-	-	-	-	-
Hordeum vulgare vulgare (grain)	-	-	6 cf	3 cf.	-	-	-	-	-	-	1	-	-
Hordeum/Triticum (grain)	-	-	70	9	11	-	-	-	1	2	-	1	-
Panicum miliaceum (grain)	-	-	-	-	-	-	-	-	-	-	-	-	-
Papilionaceae (Vicia, Lens)	1	-	-	-	-	-	-	-	-	-	-	-	-
Pisum sativum	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum aestivum (grain)	-	-	6 cf	-	9	-	-	-	-	-	-	-	-
Triticum aestivum (rachis internode)	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum dicoccum (glume base)	-	-	2	-	-	-	-	-	-	-	-	-	-
Triticum dicoccum (grain)	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum dicoccum/spelta (base)	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum dicoccum/spelta (grain)	-	-	7	-	-	-	-	-	-	-	-	-	-
Triticum monococcum (rachis internode)	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum spec. (glume base)	-	-	-	-	-	-	-	1	-	-	-	-	-
Triticum spec. (grain)	-	-	1	-	-	-	-	-	-	-	-	-	1
Triticum spelta (glume base)	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum spelta (grain)	-	-	-	-	-	-	-	-	-	-	-	-	-
Corylus avellana	-	-	-	-	-	-	-	-	-	-	-	-	-
Vitis cf. vinifera	-	-	-	-	-	-	-	-	-	-	-	-	-
Atriplex spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Avena spec. (awn)	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromus spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromus sterilis/tectorum	-	-	1 cf.	-	-	-	-	-	-	-	-	-	-
Carex spec.	-	-	1	1	-	-	-	-	-	-	-	-	-
Chenopodiaceae	-	-	-	-	-	-	-	-	-	-	-	-	-
Chenopodium album	-	-	-	-	-	-	-	-	-	-	-	-	-
Chenopodium spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Fallopia convolvulus	-	-	-	-	-	-	-	-	-	-	-	-	-
Fumaria officinalis	-	-	-	-	-	-	-	-	-	-	-	-	-
Galium aparine	-	-	-	-	-	-	-	-	-	-	-	-	-
Galium spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Galium spurium	-	-	-	-	-	-	-	-	-	-	-	-	-
Lapsana communis	-	-	-	-	-	-	-	-	-	-	-	-	-
Odontites spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Papaver setigerum	-	-	-	-	-	-	-	-	-	-	-	-	-
Papaver spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Persicaria lapathifolium	-	-	-	1	-	-	-	-	-	-	-	-	-
Plantago lanceolata	-	-	-	-	-	-	-	-	-	-	-	-	-
Poa-type	-	-	-	-	-	-	-	-	-	-	-	-	-
Polygonum aviculare	-	-	-	-	-	-	-	-	-	-	-	-	-
Polygonum spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Sambucus ebulus	-	-	-	-	-	-	-	-	-	-	-	-	-
Sambucus spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Setaria spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Solanum nigrum	-	-	-	-	-	-	-	-	-	-	-	-	-
Solanum spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Sonchus asper	-	-	-	-	-	-	-	-	-	-	-	-	-
Stachys arvensis	-	-	-	-	-	-	-	-	-	-	-	-	-
Umbelliferae	-	-	-	-	-	-	-	-	-	-	-	-	-
Vicia hirsuta	-	-	1 cf	-	-	-	-	-	-	-	-	-	-
Vicia spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Vicia tetrasperma	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 5.6. continued

	B 2284	B 2285	B 2911	B 2546	B 2548	B 2557	B 2921	D 5155	D 5245	D 5245	D 5068	D 5069	D 5076
	Ha	MBA?	Ha?	Ha?	Ha	Ha	Ha	bottom HaC	2 EBA	4 EBA	Ha	Ha	Ha
volume (L.)	3	4,5	2	4,5	4,5	4,5	4,5	3,5	1,5	6	1,5	2,5	1,5
Cerealia	3	6	1	4	4	-	1	-	-	1	-	4	2
Hordeum vulgare (grain)	-	-	-	1	1	1	4	-	2	-	-	-	-
Hordeum vulgare nudum (grain)	-	-	-	-	-	-	-	-	-	-	-	-	-
Hordeum vulgare vulgare (grain)	-	-	-	-	-	-	-	-	-	-	-	-	-
Hordeum/Triticum (grain)	-	-	-	-	1	-	-	-	5	-	-	-	1
Panicum miliaceum (grain)	-	-	-	-	-	-	-	-	-	-	-	-	-
Papilionaceae (Vicia, Lens)	-	-	-	-	-	-	-	-	-	-	-	-	-
Pisum sativum	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum aestivum (grain)	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum aestivum (rachis internode)	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum dicoccum (glume base)	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum dicoccum (grain)	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum dicoccum/spelta (base)	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum dicoccum/spelta (grain)	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum monococcum (rachis internode)	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum spec. (glume base)	-	-	-	1	1	-	-	-	-	2	-	-	-
Triticum spec. (grain)	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum spelta (glume base)	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum spelta (grain)	-	-	-	-	-	-	-	-	-	-	-	-	-
Corylus avellana	-	-	-	-	-	-	-	-	-	-	-	-	-
Vitis cf. vinifera	-	-	-	-	-	-	-	3	-	-	-	-	-
Atriplex spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Avena spec. (awn)	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromus spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromus sterilis/tectorum	-	-	-	-	-	-	-	-	-	-	-	-	-
Carex spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Chenopodiaceae	-	-	-	-	-	-	-	-	-	-	1	-	-
Chenopodium album	-	-	-	-	-	-	-	-	-	-	-	-	-
Chenopodium spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Fallopia convolvulus	-	-	-	-	-	-	-	-	-	-	-	-	-
Fumaria officinalis	-	-	-	-	-	-	-	-	-	-	-	-	-
Galium aparine	-	-	-	-	-	-	-	-	-	-	-	-	-
Galium spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Galium spurium	-	-	-	-	-	-	-	-	-	-	-	-	-
Lapsana communis	-	-	-	-	-	-	-	-	-	-	-	-	-
Odontites spec.	-	-	-	-	-	-	-	-	-	1	-	-	-
Papaver setigerum	-	-	-	-	-	-	-	-	-	-	-	-	-
Papaver spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Persicaria lapathifolium	-	-	-	-	-	-	-	-	-	-	-	-	-
Plantago lanceolata	-	-	-	-	-	-	-	-	-	-	-	-	-
Poa-type	-	-	-	-	-	-	-	-	-	-	-	-	-
Polygonum aviculare	-	-	-	-	-	-	-	-	-	-	-	-	-
Polygonum spec.	-	-	-	-	-	-	-	-	-	-	1	-	-
Sambucus ebulus	-	-	-	-	-	-	-	-	-	-	-	-	-
Sambucus spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Setaria spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Solanum nigrum	-	-	-	-	-	-	-	-	-	-	-	1	-
Solanum spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Sonchus asper	-	-	-	-	-	-	-	-	-	-	-	-	-
Stachys arvensis	-	-	-	-	-	-	-	-	-	-	-	-	-
Umbelliferae	-	-	-	-	-	-	-	-	-	-	-	-	-
Vicia hirsuta	-	-	-	-	-	-	-	-	-	-	-	-	-
Vicia spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Vicia tetrasperma	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 5.6. continued

	D 5081	D 5082	D 5083	D 5084	D 5085	D 5086	D 5101	D 5104	D 5110	D 5112	D 5117	D 5131	D 5132
	Ha	Ha	Ha	Ha	Ha	Ha	?	?	?	proto	proto	LBA	LBA
volume (L.)	2	2	2	2	2	2	1	2,5	1,5	2,5	2	2,5	1,5
Cerealia	-	-	100	-	-	-	-	1	1	1	3	-	1
Hordeum vulgare (grain)	-	-	16	-	-	-	1	-	-	-	-	-	-
Hordeum vulgare nudum (grain)	-	-	-	-	-	-	-	-	-	-	-	-	-
Hordeum vulgare vulgare (grain)	-	5	-	158	171	18	-	-	-	-	-	-	-
Hordeum/Triticum (grain)	-	57	106	xxx	xxx	40	1	-	-	-	-	-	-
Panicum miliaceum (grain)	-	-	-	-	-	-	-	-	-	-	-	-	-
Papilionaceae (Vicia, Lens)	-	-	-	-	-	-	-	-	-	-	-	-	-
Pisum sativum	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum aestivum (grain)	-	21	-	-	-	-	-	-	-	-	-	-	-
Triticum aestivum (rachis internode)	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum dicoccum (glume base)	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum dicoccum (grain)	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum dicoccum/spelta (base)	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum dicoccum/spelta (grain)	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum monococcum (rachis internode)	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum spec. (glume base)	-	-	-	10	5	-	-	-	-	-	-	-	-
Triticum spec. (grain)	1	16	-	-	-	-	-	-	-	-	-	-	-
Triticum spelta (glume base)	-	-	6	5	2	3	-	-	-	-	-	-	-
Triticum spelta (grain)	-	5	116	94	61	13	-	-	-	-	-	-	-
Corylus avellana	-	-	-	-	-	-	-	-	-	-	-	-	-
Vitis cf. vinifera	-	1	-	-	-	1	-	-	-	-	-	-	-
Atriplex spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Avena spec. (awn)	-	-	-	-	1	-	-	-	-	-	-	-	-
Bromus spec.	-	-	-	-	1 cf.	-	-	-	-	-	-	-	-
Bromus sterilis/tectorum	-	-	-	-	-	-	-	-	-	-	-	-	-
Carex spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Chenopodiaceae	-	-	-	-	-	-	-	-	-	-	-	-	-
Chenopodium album	-	-	-	-	-	-	-	-	-	-	-	-	-
Chenopodium spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Fallopia convolvulus	-	-	2	-	1	-	-	-	-	-	-	-	-
Fumaria officinalis	-	-	-	-	-	-	-	-	-	-	-	-	-
Galium aparine	-	-	-	-	-	-	-	-	-	-	-	-	-
Galium spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Galium spurium	-	-	-	-	-	-	-	-	-	-	-	-	-
Lapsana communis	-	-	-	-	-	-	-	-	-	-	-	-	-
Odontites spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Papaver setigerum	-	-	-	-	2 cf.	1	-	-	-	-	-	-	-
Papaver spec.	-	-	-	-	1	-	-	-	-	-	-	-	-
Persicaria lapathifolium	-	-	-	-	-	-	-	-	-	-	-	-	-
Plantago lanceolata	-	-	-	-	-	-	-	-	-	-	-	-	-
Poa-type	-	-	-	1	-	-	-	-	-	-	-	-	-
Polygonum aviculare	-	-	-	-	-	-	-	-	-	-	-	-	-
Polygonum spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Sambucus ebulus	-	-	-	-	-	-	-	-	-	-	-	-	-
Sambucus spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Setaria spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Solanum nigrum	-	-	-	-	-	-	-	-	-	-	-	-	-
Solanum spec.	-	-	-	-	-	1	-	-	-	-	-	-	-
Sonchus asper	-	-	-	-	-	-	-	-	-	-	-	-	-
Stachys arvensis	-	-	-	-	-	-	-	-	-	-	-	-	-
Umbelliferae	-	-	-	-	-	-	-	-	-	-	-	-	-
Vicia hirsuta	-	-	-	1, 1 cf.	-	-	-	-	-	-	-	-	-
Vicia spec.	-	-	-	-	1 cf.	-	-	-	-	-	-	x cf	-
Vicia tetrasperma	-	-	-	-	-	1cf	-	-	-	-	-	-	-

Table 5.6. continued

	D 5133	D 5134	D 5161	D 5162	D 5164
	LBA	LBA	Ha	Ha	Ha
volume (L.)	2	1,5	2	2	2,5
Cerealia	2	1	2	1	1
Hordeum vulgare (grain)	-	-	-	-	-
Hordeum vulgare nudum (grain)	-	-	-	-	-
Hordeum vulgare vulgare (grain)	-	-	-	-	-
Hordeum/Triticum (grain)	-	-	-	-	-
Panicum miliaceum (grain)	-	-	-	-	-
Papilionaceae (Vicia, Lens)	-	-	-	-	-
Pisum sativum	-	-	-	-	-
Triticum aestivum (grain)	-	-	-	-	-
Triticum aestivum (rachis internode)	-	-	-	-	-
Triticum dicoccum (glume base)	-	-	-	-	-
Triticum dicoccum (grain)	-	-	-	-	-
Triticum dicoccum/spelta (base)	-	-	-	-	-
Triticum dicoccum/spelta (grain)	-	-	-	-	-
Triticum monococcum (rachis internode)	-	-	-	-	-
Triticum spec. (glume base)	-	-	-	-	-
Triticum spec. (grain)	1	-	-	-	-
Triticum spelta (glume base)	-	-	-	-	-
Triticum spelta (grain)	-	-	-	-	-
Corylus avellana	-	-	-	-	-
Vitis cf. vinifera	-	-	-	-	-
Atriplex spec.	-	-	-	-	-
Avena spec. (awn)	-	-	-	-	-
Bromus spec.	-	-	-	-	-
Bromus sterilis/tectorum	-	-	-	-	-
Carex spec.	-	-	-	-	-
Chenopodiaceae	-	-	-	-	-
Chenopodium album	-	-	-	-	-
Chenopodium spec.	-	-	-	-	-
Fallopia convolvulus	-	-	-	-	-
Fumaria officinalis	-	-	-	-	-
Galium aparine	-	-	-	-	-
Galium spec.	-	-	-	-	-
Galium spurium	-	-	-	-	-
Lapsana communis	-	-	-	-	-
Odontites spec.	-	-	-	-	-
Papaver setigerum	-	-	-	-	-
Papaver spec.	-	-	-	-	-
Persicaria lapathifolium	-	-	-	-	-
Plantago lanceolata	-	-	-	-	-
Poa-type	-	-	-	-	-
Polygonum aviculare	-	-	-	-	-
Polygonum spec.	-	-	-	-	-
Sambucus ebulus	-	-	-	-	-
Sambucus spec.	-	-	-	-	-
Setaria spec.	-	-	-	-	-
Solanum nigrum	-	-	-	-	-
Solanum spec.	-	-	-	-	-
Sonchus asper	-	-	-	-	-
Stachys arvensis	-	-	-	-	-
Umbelliferae	-	-	-	-	-
Vicia hirsuta	-	-	-	-	-
Vicia spec.	-	-	-	-	-
Vicia tetrasperma	-	-	-	-	-

Table 5.6 List of species. Crévêchamps "Tronc du Chêne" Zone A, B and D

- f or fr = fragment
- cf = tentative identification
- XXX = 100-1000
- ovk = waterlogged
- X = 1-10
- XXXX = more than thousand
- vk = charred
- XX = 10-100
- XXXXX = more than 10.000

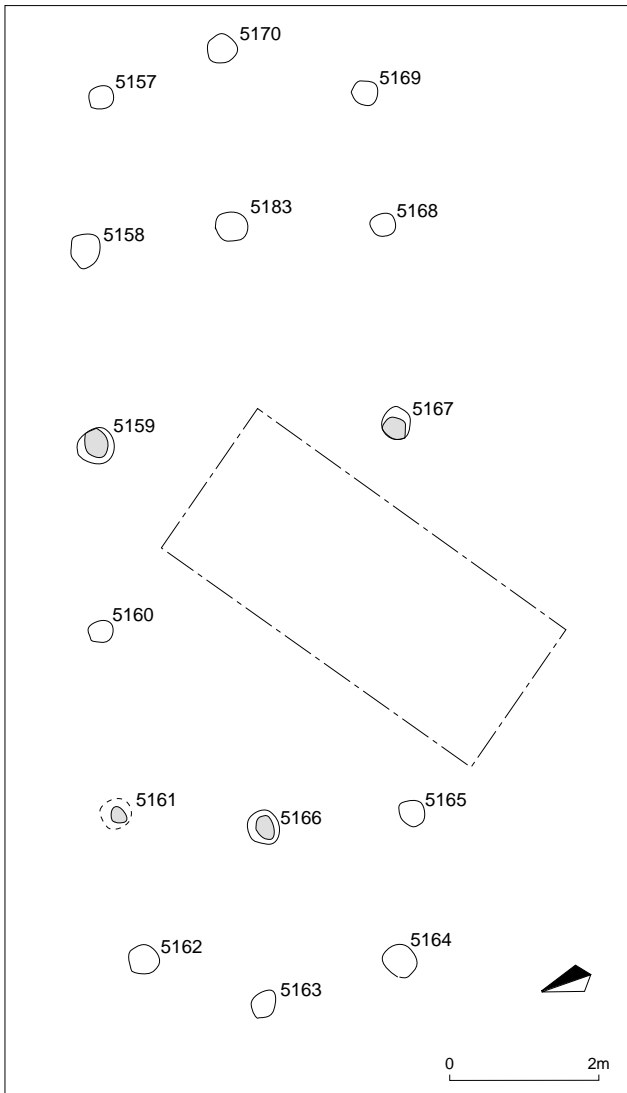


Fig. 5.14 Crévéchamps zone D - building 30 (Hallstatt)

nut was present. Charred seeds of fourteen different taxa of arable weeds were found.

Zone B: 37 out of 97 samples yielded plant remains, mostly in small quantities. Several crops were found in the — predominantly Hallstatt — structures, like barley, spelt wheat, and millet. A mixture of naked and hulled six-row barley dominates the sample from structure 2625 (Bronze Moyen). The identification of the remains of chaff remains difficult. Chaff remains in structure 2625 were identified as spelt wheat (see figure 5.15). Fragments of hazelnut were present. Charred seeds of seven different taxa of arable weeds were found.

Zone D: 34 out of 70 samples yielded plant remains, mostly in small quantities. Several crops were found in the —

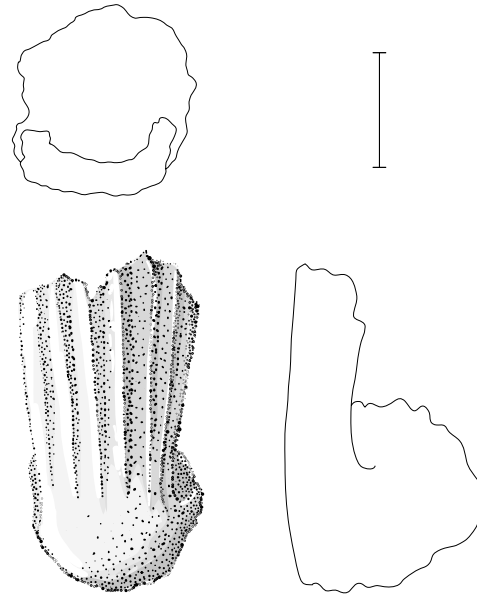


Fig. 5.15 Crévéchamps zone B - structure 2625 *Triticum spelta* chaff, bar = 1 mm

predominantly Hallstatt — structures, like hulled barley, millet, bread wheat, spelt wheat, gold-of-pleasure, and horse bean. Charred seeds of 27 different taxa of arable weeds were found. It appeared impossible to establish if the single specimens of poppy (*Papaver setigerum*) represent the cultivated species or weeds (see figure 5.16).

5.6.5 REMARKS ON THE IDENTIFICATION

In one case, botanical material itself was submitted to an accelerator dating. This concerns one of the several uncarbonized pips of grape (*Vitis cf. vinifera*) that were retrieved from various Hallstatt features in the site of Crévéchamps. Because of the extraordinary character of this find, its Hall-

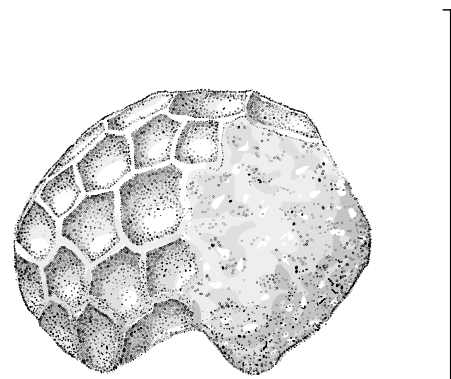


Fig. 5.16 Crévéchamps zone D - structure 5086 *Papaver setigerum*, bar = 1 mm

statt origin needed to be confirmed. The fact that the grape pips were preserved in uncarbonized state could indeed indicate that they were not fossil remains. The particular grape pip that was dated appeared to be a (sub-) recent intrusion (GrA-14140 Crévéchamps D 5155: 75 +/- 30 BP). The identification of the grains of spelt wheat from building 18 in Zone D caused major problems. In the assemblage, various grain types could be distinguished. Small, compact bread wheat-like grains and larger emmer wheat-like grains were present among the clearly spelt wheat grains. Still, we have the impression that only one single species is concerned, so with some reservation, all wheat grains were listed as spelt wheat. The same problem concerns the cereal grains from building 8 in Zone B. Here too, smaller bread wheat-like seeds are alternated with larger emmer wheat-like grains. As the preservation of the seeds is much worse than in Zone D, no attempt was made to further identify the cereals. Therefore, the wheat grains are listed as *Triticum dicoccum/spelta*, *Triticum aestivum* and *Triticum spec.*

5.7 Ennery “Kléber” (57)

5.7.1 INTRODUCTION

The village of Ennery is located at 12 kilometres north of Metz, east of the Moselle. The site is situated on the Middle Terrace at 1600 metres from the present river course. It consists of marl covered with sandy loam. The construction of the *depôt* “Kléber” necessitated the rescue excavation of circa 2 hectares. On the site of Ennery “Kléber” prospective investigations were carried out in 1991. In 1992 this Rössen site was completely excavated (Lafitte/Vanmoerkerke 1991). Bakels (unpublished) carried out the archaeobotanical analysis on the Middle Neolithic (Rössen) material. Only one structure (26) was attributed to a later period, dating from the *Campaniforme final* period (Lafitte/Vanmoerkerke 1991, 62). It is 85 cm in diameter and was dug into the marl and a layer of limestone, and preserved at 26 cm depth. From this structure, interpreted as a silo or an oven, one soil sample was analysed by J. Goudzwaard. Unfortunately, the sample did not yield any fossil botanical material.

5.8 Ennery “Solotra” (57)

5.8.1 INTRODUCTION

The excavations in the community of Ennery were carried out by the Service Régional de l’Archéologie de Lorraine, under the direction of Jan Vanmoerkerke. The terrain is located 1500 metres east of the river Moselle, halfway between the towns of Metz and Thionville. It is situated on the Middle Terrace, the subsurface being composed of marl, alternated by limestone layers covered by loam. The site is situated at the location of the present industrial zone of Ennery, 400 metres from the site of Ennery “Kléber” (see

above). Ennery “Solotra” is part of a large archaeological project in this area, where c. 40 archaeological sites were investigated. The first archaeological features were discovered during prospective investigations in 1990. Large-scale rescue excavations on 0,5 hectare took place in the same year, during which the main features were excavated. It proved difficult to estimate the archaeological value of this location, as the site appeared to be more interesting and complex than foreseen. Due to this factor and time limits, it was not possible to analyse all results in detail (Milutinovic/Vanmoerkerke 1993).

5.8.2 FEATURES

As well as the structures of a Roman occupation phase, the remains of only the most profound features of two prehistoric occupation phases were recovered. The first one is dated to the end of the Bronze Ancien: the pits 27, 55 and 165 could be attributed to this period. The second phase is dated to the end of the Late Bronze Age.

5.8.3 SAMPLES

Only two samples were selected for investigation, from silo 27 and silo 55, both dating to the end of the Early Bronze Age (c 1600-1500 BC). The volume and context description of the two samples are given in table 5.7. The botanical analyses were carried out by J. Goudzwaard and W. Kuijper.

5.8.4 MACRO REMAINS

The two samples produced very low numbers of botanical remains. They contained some grains of wheat (*Triticum spec.*), five different arable weeds and fragments of hazelnut (*Corylus avellana*).

volume (l.)	27 silo end of EBA 8	55 silo end of EBA unknown
Triticum spec. (glume base)	-	1
Triticum spec. (grain)	4	-
Corylus avellana	2f.	-
Brassica spec.	1	-
Carex spec.	1	-
Chenopodium album	1	-
Sambucus spec.	1	-
Vicia hirsuta	1	-

Table 5.7 List of species. Ennery Solotra

- f or fr = fragment
- cf = tentative identification
- XXX = 100-1000
- ovk = waterlogged
- X = 1-10
- XXXX = more than thousand
- vk = charred
- XX = 10-100
- XXXXX = more than 10.000

5.9 Frouard “Haut de Penotte” (54)

5.9.1 INTRODUCTION

The village of Frouard (department of Meurthe-et-Moselle) is situated at c. 10 kilometres north of the town of Nancy. The site of Frouard “Haut de Penotte” is situated at the head of a small side valley of the river Meurthe, close to the site of Frouard “Z.A.C. du Saule Gaillard” (see below). The bottom of the valley consists of slope debris and colluvial loams. The site was discovered in 1989 during archaeological prospections carried out by the Direction des Antiquités de Lorraine. A surface of five hectares was prospected in advance of building activities and three archaeologically important zones were distinguished. In 1990 rescue excavations took place, under the direction of Marie-Pierre Koenig (Buzzi/Koenig n.d.; Buzzi/Koenig 1990a). In total, one hectare was excavated extensively.

5.9.2 FEATURES

Despite the rather strong slope of the terrain of up to 12%, very well preserved archaeological features were discovered (Buzzi/Koenig 1990a). Early Bronze Age, Late Bronze Age (IIb-IIIa) and Early Iron Age occupation phases were attested.

Zone I of Frouard “Haut de Penotte” produced two rectangular houses and three four-posted granaries, various pits and silos, extraction pits and individual postholes, all dated to the Bronze Age (figure 5.17). House 1 is an Early Bronze Age, three-aisled building (7.60 x 16 metres with a probable enlargement to 21 metres, see figure 5.18). The plan could very well be compared to the plan of building D 162 at the site of the Aeroport Régional (see above) and to the Early Bronze Age house (5) at the location Frouard “Z.A.C. du Saule Gaillard” (see below). They offer the same characteristic elements: one central aisle, two lateral aisles, an abside, two successive building phases, and comparable dimensions. On the basis of these parallels a date in the Early Bronze Age is proposed. A C14 dating has to confirm this hypothesis. House 2 also is dated in the Early Bronze Age, based on comparisons with Danish house plans (figure 5.19).

In Zone II a large rectangular building, a hearth and numerous four-, six- and nine-posted granaries were recovered, all very well preserved and predominantly attributable to the Hallstatt period. Close to the granaries, numerous pits and silos (2035, 2041, and 2091) are situated. A number of vases-silos (2085, 2087 and 2088) and other small pits, probably also remains of vases-silos (2174, 2175, 2176) surround a central pit (2086) (figure 5.20). Together, they form an intriguing pit circle, in some aspects comparable to the pit circles (type e) found in Middle Bronze Age Bovenkarspel, West-Friesland (Buurman 1979).

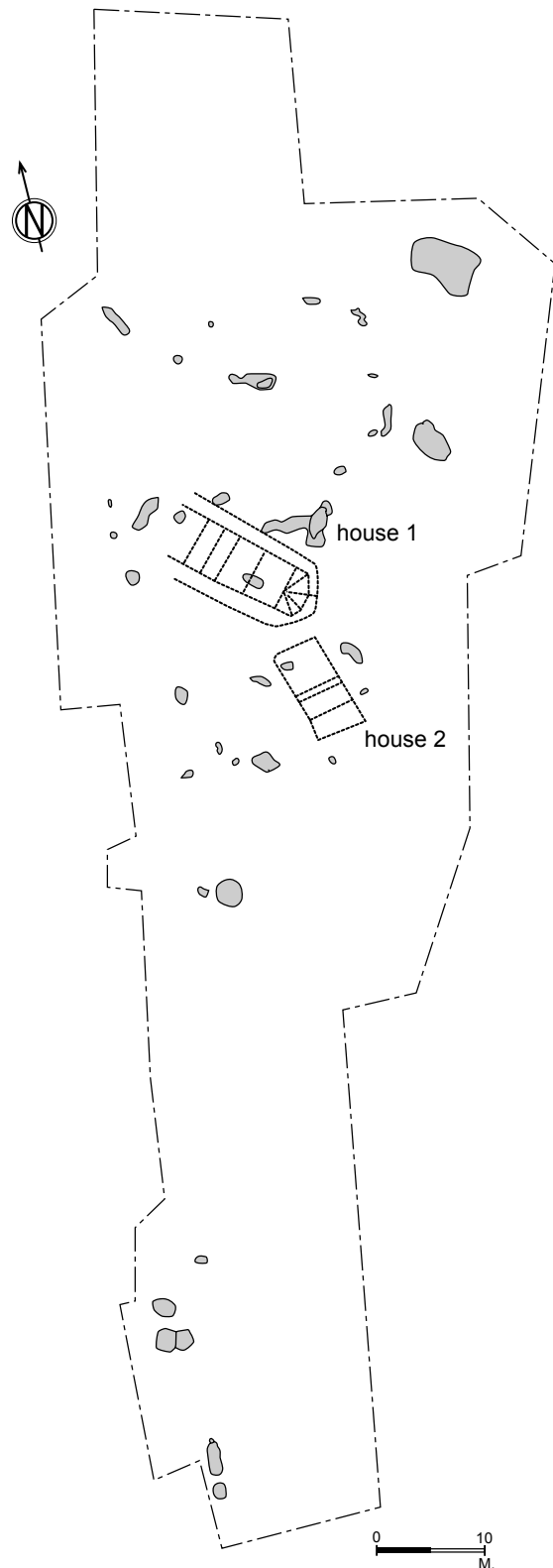


Fig. 5.17 Frouard "Haut de Penotte" - zone I

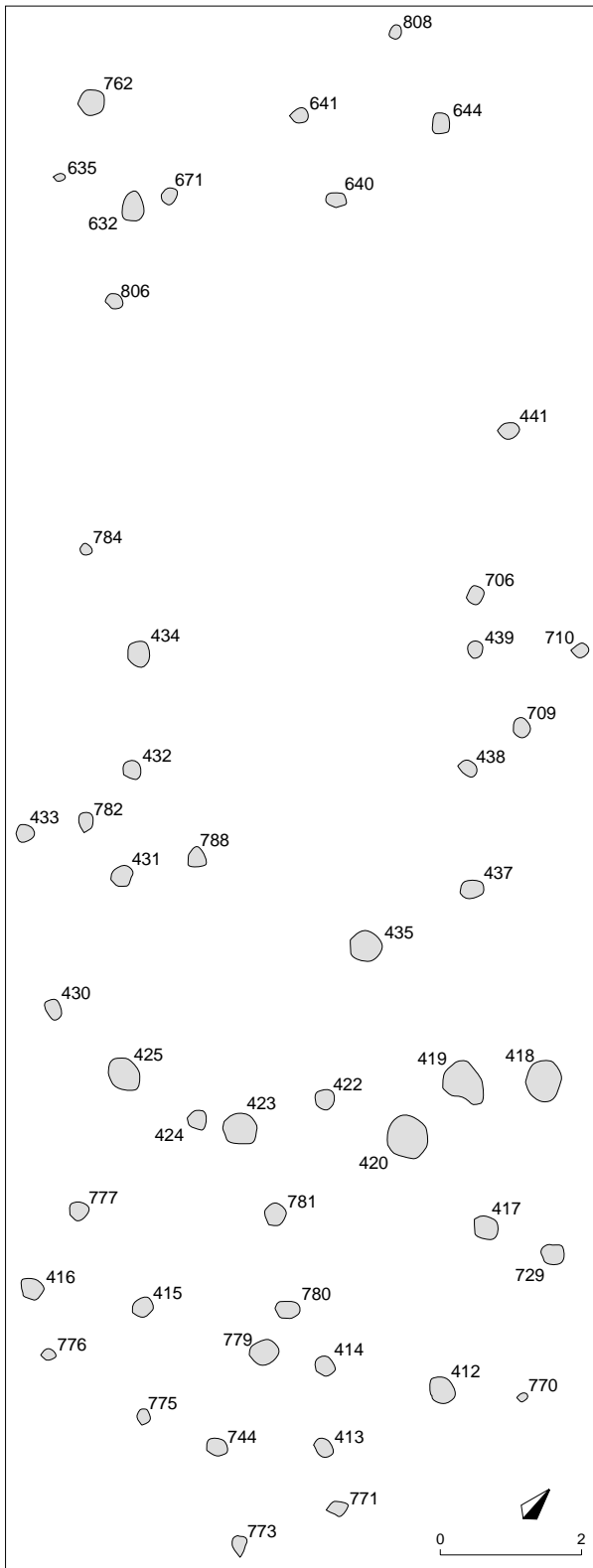


Fig. 5.18 Frouard "Haut de Penotte" house 1

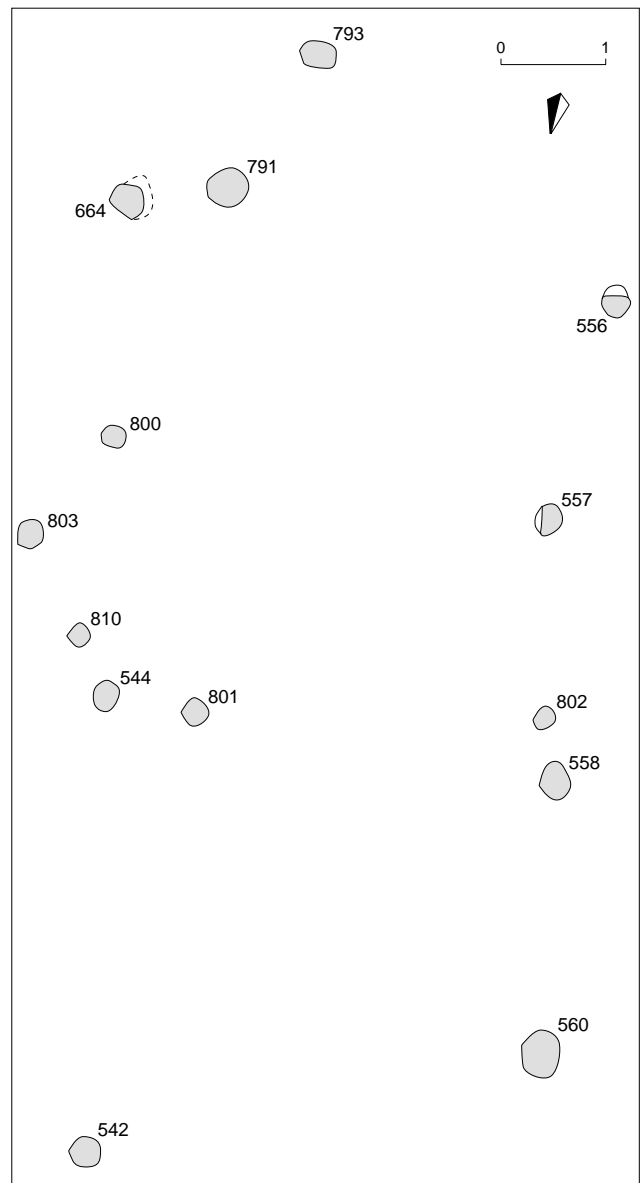


Fig. 5.19 Frouard "Haut de Penotte" house 2

5.9.3 SAMPLES

A total number of 57 samples was selected for further investigation. Postholes of the Early Bronze Age houses 1 and 2, the circle of pits and silos, and individual pits and silos (all dated in the Hallstatt period) were investigated by the author, J. Goudzwaard and W. Kuijper. The volume and context descriptions for each sample are given in table 5.8.

5.9.4 MACRO REMAINS

Out of 57 samples, 29 did not yield any botanical remains. The Early Bronze Age houses show a very low distribution

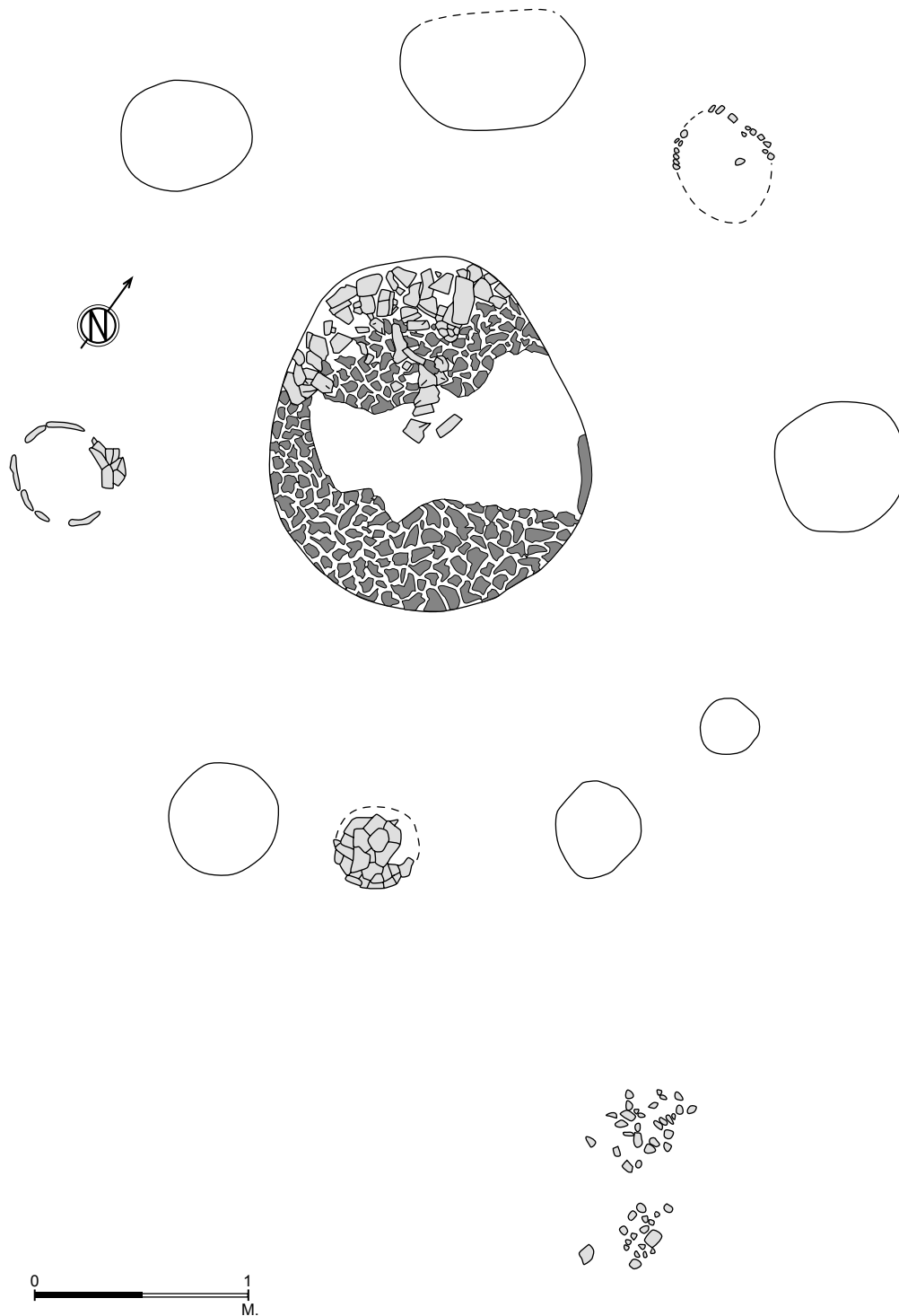


Fig. 5.20 Frouard "Haut de Penotte" - zone II, circle of storage pits: structure 2086 and vase-silos

	412 EBA	415 EBA	417 EBA	418 EBA	425 EBA	434 EBA	435 EBA	632 EBA	671 EBA	725 EBA	762 EBA	779 EBA	780 EBA	808 EBA
(end of-)														
volume (L.)	?	?	?	3	1,5	5	2	?	?	2	3,5	?	2,5	3,5
Cerealia	-	-	-	-	-	1	-	-	1	4	5	2	-	-
Hordeum vulgare (grain)	-	-	-	-	1	-	-	-	-	-	-	-	-	-
Hordeum vulgare nudum (grain)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hordeum vulgare vulgare (grain)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Panicum miliaceum (grain)	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Triticum dicoccum (grain)	-	-	-	-	-	-	-	-	-	1	-	-	-	-
Triticum monococcum (glume base)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum monococcum (grain)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum spec. (glume base)	2	1	2	12	-	-	-	-	-	1	-	2	-	1
Triticum spelta (grain)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vicia faba	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Prunus spec.	-	-	-	-	-	-	-	-	-	-	-	-	1 cf	-
Quercus spec./Corylus avellana	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Bromus secalinus-type	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromus spec.	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromus sterilis/tectorum	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chenopodiaceae	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chenopodium album	3	-	-	-	1	-	-	-	-	-	-	-	-	-
Chenopodium ficifolium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Echinochloa crus-galli	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Galium aparine	-	-	-	-	-	-	1	-	-	-	-	-	-	-
Galium spec.	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Gramineae	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Papilionaceae	-	-	-	-	1	-	-	-	-	-	-	1	-	-
Plantago lanceolata	-	-	-	-	-	-	-	-	-	-	-	-	1	-
Poa spec.	1	1	-	-	-	-	-	-	-	-	-	-	-	-
Rumex acetosella	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rumex spec.	-	3	-	-	-	-	-	-	-	-	-	-	-	-
Sambucus ebulus	-	-	-	-	-	-	-	-	-	1	-	-	-	-
Vicia hirsuta	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vicia hirsuta/tetrasperma	-	-	-	-	-	-	-	1	-	-	-	-	-	-

Table 5.8 List of species. Frouard "Haut de Penotte"

- f or fr = fragment
- cf = tentative identification
- XXX = 100-1000
- ovk = waterlogged
- X = 1-10
- XXXX = more than thousand
- vk = charred
- XX = 10-100
- XXXXX = more than 10.000

	557	558	664	2030	2035	2041	2085	2086	2091	2171	2172	2174	2175	2176
	EBA	EBA	EBA	HaD	HaD	HaD	HaB2/3	HaB2/3	HaA2/B1	?	HaA-D	HaB1	HaB1	HaB1
(end of-)	2	5	3	4	?	4	4,5	0,5	6	2,5	1	3	2,5	3
Cerealia-		3	2	11	xx	-	1	4	xxx	1	-	2	6	3
Hordeum vulgare (grain)	-	-	-	1cf	-	-	-	-	-	-	-	-	4	-
Hordeum vulgare nudum (grain)	-	-	-	-	-	-	-	-	xxxx	-	-	-	-	-
Hordeum vulgare vulgare (grain)	-	-	-	-	1	-	-	-	xxxx	-	-	-	-	-
Panicum miliaceum (grain)	-	-	-	-	-	-	-	-	-	-	-	-	-	2
Triticum dicoccum (grain)	-	-	-	-	-	-	-	-	3	-	-	-	-	-
Triticum monococcum (glume base)	-	-	-	-	1cf	-	-	-	-	-	-	-	-	-
Triticum monococcum (grain)	-	-	-	-	1 cf	-	-	-	-	-	-	-	-	-
Triticum spec. (glume base)	-	7	-	-	-	-	-	-	-	-	-	1	1	-
Triticum spelta (grain)	-	-	-	-	1	-	-	-	-	-	-	-	-	-
Vicia faba	-	-	-	-	xxx	-	-	-	-	-	-	-	-	-
Prunus spec.	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Quercus spec./Corylus avellana	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromus secalinus-type	-	-	-	-	-	-	-	-	1	-	-	-	-	-
Bromus spec.	-	-	-	-	-	-	-	-	1	-	-	-	-	-
Bromus sterilis/tectorum	-	-	-	-	-	-	-	-	1	-	-	-	-	-
Chenopodiaceae	-	-	-	-	-	-	1	-	-	-	-	-	-	-
Chenopodium album	-	-	-	1	-	-	2	-	1	2	2	-	3	2
Chenopodium ficifolium	-	-	-	-	-	2	-	-	-	-	-	-	-	-
Echinochloa crus-galli	-	-	-	-	-	-	-	-	-	-	-	-	1	-
Fallopia convolvulus	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Galium aparine	-	-	-	-	-	-	-	1	1	-	1	-	7	-
Galium spec.	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gramineae	-	-	-	-	-	-	-	-	1	-	-	-	-	-
Papilionaceae	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Plantago lanceolata	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Poa spec.	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rumex acetosella	-	-	-	-	-	-	-	-	-	-	-	-	1cf	-
Rumex spec.	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Sambucus ebulus	-	-	-	-	-	-	-	-	1	-	-	-	-	-
Vicia hirsuta	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Vicia hirsuta/tetrasperma	-	-	-	-	-	1	-	-	-	-	-	-	-	2

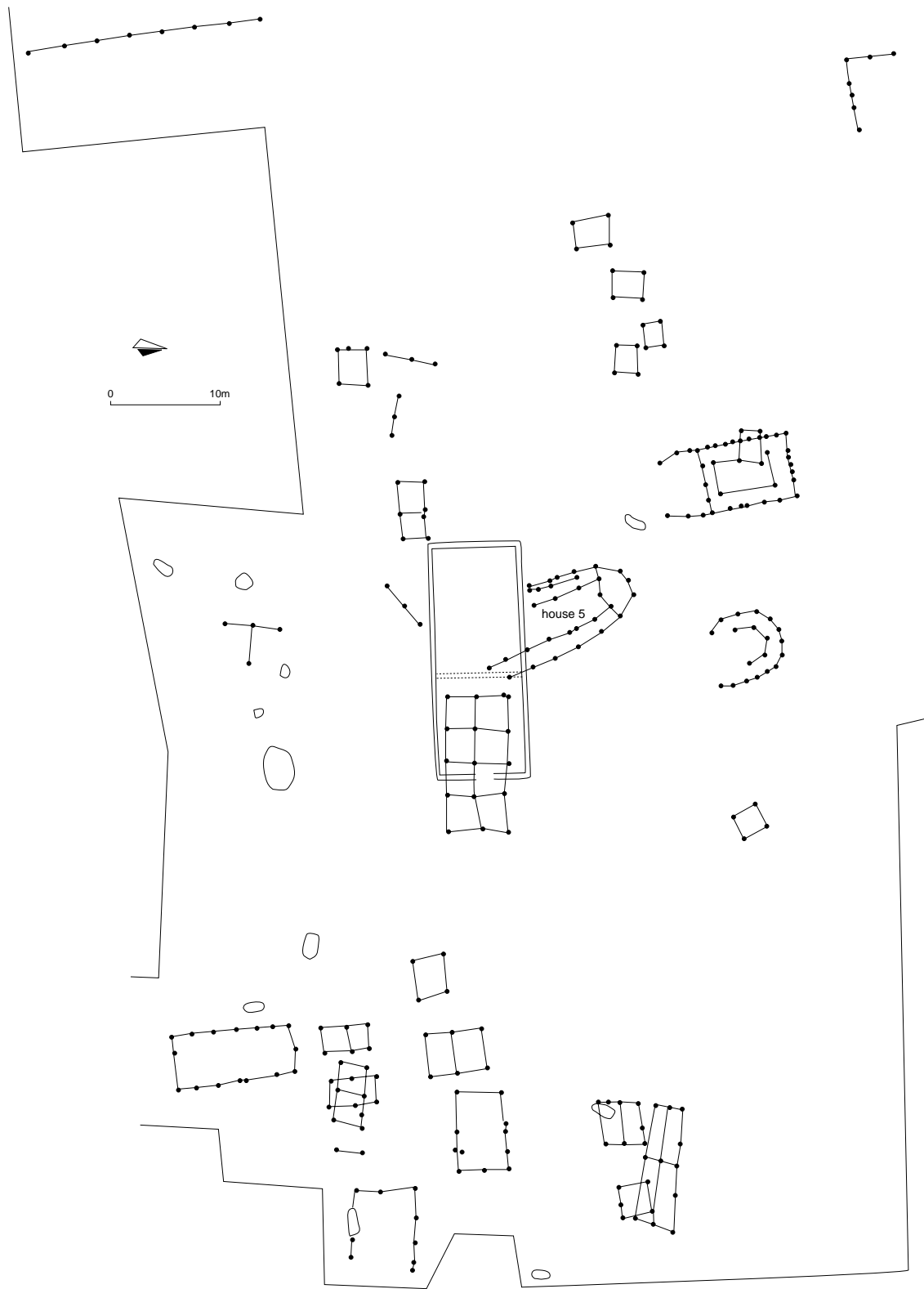


Fig. 5.21 Frouard "Z.A.C. du Saule Gailard" zone I

of seeds: some barley and wheat grains and a grain of common millet, some charred remains of wild collected species and eleven different taxa (remains identified up to family, genus and species level) of arable weeds were found. With the exception of the samples from the silos 2035 and 2091, the Hallstatt samples produced relatively low numbers of seeds. Very few grains of barley, millet and emmer wheat, a possible grain and glume base of einkorn and a grain of spelt were present.

The grains of six-row barley dominate the sample from silo 2091. The thousands of barley grains belong to the hulled and naked variety, in equal proportions. The sample from structure 2035 is dominated by hundreds of horse bean (*Vicia faba*) grains. In the majority of the samples, very low numbers of weed seeds were found.

5.10 Frouard “Z.A.C. du Saule Gaillard” (54)

5.10.1 INTRODUCTION

The agglomeration of Frouard (department of Meurthe-et-Moselle) is situated at circa 10 kilometres north of the city of Nancy. The site of Frouard “Z.A.C. du Saule Gaillard”, in the neighbourhood “Montant de Nerbevau”, is situated west of the village of Frouard, some kilometres upstream of the confluence of the rivers Meurthe and Moselle. The substratum is composed of slope deposits covered with loam. The site is situated on the east slope of a cuesta overhanging the present river valley of the Meurthe.

In 1986, a first prospective investigation of 25 hectares took place, which was followed by an extensive excavation campaign “Saule Gaillard, zone I”, in 1987. A total surface of 1,5 hectare was excavated and c. 600 archaeological features were discovered (figure 5.21). The site revealed occupation phases from the Middle Neolithic (4800 BC) to the medieval period (Collectif 1987, 26). The 600 archaeological features were predominantly located in an ancient channel filled with colluvial deposits. The excavation of Frouard “Saule Gaillard, zone II” took place in 1990 under the direction of Marie-Pierre Koenig (Buzzi/Koenig 1990b). It covered 1 hectare and is located north of the zone that was investigated in 1987.

5.10.2 FEATURES

In zone I, numerous structures are attributed to the Early Bronze Age and correspond to a domestic unity, composed of a large, three-aisled, absidial house (house 5), two annexe buildings, and pits of which the interpretation is difficult, but one of which demonstrated artisan activities (metallurgy). Calibrated 14C datation of different structures in Frouard “Saule Gaillard” places its occupation at the end of the Early Bronze Age, i.e. in the 17th or 16th century BC. The farmhouse shows several double posts, indicating an important restoration or enlargement phase (dimensions: 17

x 5.70 and later 6.80 metres, see also figure 2.2). The evidence of a restoration phase of house 5 could be indicative of an occupation lasting longer than normally is supposed for this period (Blouet et al 1992). The restoration could also be related to the stalling of cattle, if the house is interpreted as a longhouse (stable-farm). A small domestic oven and traces of charcoal, charred cereal grains and acorns were found inside the house. Eight pits in the periphery of the house, a.o. a large pit (400), are associated with it. This latter feature is 0,7 x 2,5 metres, was dug into the gravel and produced pottery sherds, well preserved animal bones, large pots, etc.

5.10.3 SAMPLES

From the “Saule Gaillard” excavation, zones I and II, a total of 23 samples was examined. In zone I, the fills of 18 post-holes of the Early Bronze Age “house 5” were investigated, as well as the contents of structure 400, a large pit associated with this building. In zone II, the filling of pit 56 — date not certain — and three samples from structure 61 (a Bronze final IIIa — silo or oven) were analysed. The analyses were carried out by the author, J. Goudzwaard and W. Kuijper. The volume for each sample is given in table 5.9.

5.10.4 MACRO REMAINS

Two samples from the Early Bronze Age house 5 did not yield any botanical remains. The remaining ones produced relatively large numbers of seeds: quite remarkable are the large amounts of (fragments of) charred acorns in the post-holes of this farmhouse. In the Bronze Age house small numbers of cereals were also found (emmer wheat, among others). In structure 56 (no date), a relatively large number of remains of acorns were found as well. In the Late Bronze Age structure 61, the number of crops found is higher. Some remains of chaff in the ashy layer on the bottom clearly belong to spelt wheat; others are spelt-like, but as this identification remains tentative, they are listed as *Triticum* spec. Furthermore, seeds of barley, millet, lentil and horse bean were recovered. Structure 61 was said to have yielded charred apples (Buzzi/Koenig 1990b, 54). These remains, however, were never seen by the author.

The numbers of weed seeds are low in the Early Bronze Age house (9 different taxa), but much higher in the Late Bronze Age contexts (16 different taxa).

5.11 Gandrange (57)

5.11.1 INTRODUCTION

The community of Gandrange is situated halfway between Thionville and Metz, close to the river Moselle. The excavated site is located west of the present river course. The archaeological analysis of this site is still in preparation (Petit-Didier in prep).

	56	61	61	61	195	197	241	243	244	245	246	250	254	275	402	408	410	416	417	400
layer	?	BfIIIa	BfIIIa	BfIIIa	EBA	EBA	EBA	EBA	EBA	EBA	EBA	EBA	EBA	EBA	EBA	EBA	EBA	EBA	EBA	EBA
		3	2	1	(end of EBA = 1700-1500 BC)															
volume (L.)	1	2	2	2	1,5	1,5	2	1,5	1	1,5	0,5	1	0,5	1,5	1	2	1,5	1	0,5	2
Cerealia	2f	2	-	5	1f	-	5f	-	2f	-	-	-	-	4f	1	-	1f	-	-	4
Hordeum vulgare (grain)	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lens culinaris	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Panicum miliaceum (grain)	-	4	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum dicoccum (grain)	1	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-
Triticum spec. (glume base)	-	20	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum spec. (grain)	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-
Triticum spelta (glume base)	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1cf
Vicia faba	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Corylus avellana	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	1	-	-	-	1
Malus spec.	-	?	?	?	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Prunus spec.	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Quercus spec. (fragments)	24	-	-	-	17	86	-	71	152	62	XX	12	4	62	2	115	43	61	10	-
Atriplex spec.	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chenopodiaceae	-	2	XXX	60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chenopodium album	-	4	-	52	-	-	-	2	2	-	-	-	-	1	-	1	1	-	-	-
Fallopia convolvulus	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	-	-	-	-	-
Galium aparine	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Galium palustre	-	4	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Galium spec.	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gramineae	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Medicago lupulina	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mentha aquatica/arvensis	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Papilionaceae	-	1	XX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Persicaria lapathifolium	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Plantago lanceolata	-	18	6	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
Rumex acetosella	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Rumex spec.	-	3	-	-	-	2	-	-	-	-	-	1	-	-	-	-	-	1	-	-
Sambucus spec.	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Solanum dulcamara	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tilia cordata	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Verbena officinalis	-	1f	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vicia hirsuta	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vicia hirsuta/tetrasperma	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vicia spec.	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 5.9 List of species. Frouard "Z.A.C. du Saule Gaillard"

- f or fr = fragment
- cf = tentative identification
- XXX = 100-1000
- ovk = waterlogged
- X = 1-10
- XXXX = more than thousand
- vk = charred
- XX = 10-100
- XXXXX = more than 10.000

	1013 Bf/Ha D3	1014 Bf/Ha D3	1015 Bf/Ha D3	1016 Bf/Ha D3	1018 Bf/Ha D3	1019 Bf/Ha D3	1030 Bf/Ha D3
Cerealia	-	-	5	4	1	1	1
Hordeum vulgare vulgare (grain)	1	1	3	1	-	-	-
Triticum spec. (glume base)	-	-	-	-	-	1	-
Triticum spec. (rachis internodium)	-	1	-	-	-	-	-
Triticum/Hordeum (grain)	5	4	-	-	-	-	-
Chenopodium album	-	-	-	-	1	-	-
Vicia spec.	-	1	-	-	-	-	-

Table 5.10 List of species. Gandrange "Z.A.C. des Brequettes"

- f or fr = fragment • cf = tentative identification • XXX = 100-1000
- ovk = waterlogged • X = 1-10 • XXXX = more than thousand
- vk = charred • XX = 10-100 • XXXXX = more than 10.000

	13 layer	13 Ha?	15 Ha?	15 Ha?	15 Ha?	15 Ha?
volume (L.)	3	4	2	4	5	2
	4	8	6	6	2	2
Cerealia	2	29	37	15	12	4
Linum usitatissimum	-	-	1	-	-	-
Panicum miliaceum (grain)	-	1 cf	-	-	-	-
Triticum dicoccum (grain)	-	-	2	-	-	-
Triticum spec. (glume base)	-	4	2	14	-	-
Corylus avellana	1	-	-	-	-	-
Prunus spinosa	-	-	5f	-	-	-
Atriplex spec.	-	-	1	-	-	-
Bromus secalinus-type	-	-	6	-	-	-
Bromus spec.	-	1	17f	-	-	-
Bromus sterilis/tectorum	-	-	2	-	-	-
Chenopodium album	1	5	8	4	3	1
Chenopodium hybridum	-	-	-	1	-	-
Chenopodium polyspermum	-	-	-	1	-	-
Chenopodium spec.	-	-	-	-	-	1
Fallopia convolvulus	-	-	2	-	1	-
Galium aparine	-	-	-	-	-	1
Galium spurium	-	1	-	2 cf.	-	-
Lapsana communis	-	-	1	-	-	-
Papilionaceae	-	-	-	-	1	-
Persicaria lapathifolia/maculosa	-	1	-	-	-	-
Poa annua	-	-	1	-	-	-
Poa annua/Phleum spec.	-	1	-	-	-	-
Polygonum spec.	-	-	-	1	-	-
Rumex spec.	-	-	2	-	-	-
Solanum nigrum/dulcamara	-	1	-	-	-	-
Vicia hirsuta	-	-	-	1cf.	1	2

Table 5.11 List of species. Gavisse

- f or fr = fragment • cf = tentative identification • XXX = 100-1000
- ovk = waterlogged • X = 1-10 • XXXX = more than thousand
- vk = charred • XX = 10-100 • XXXXX = more than 10.000

5.11.2 SAMPLES

From the postholes of seven buildings dated in the transitional period Bronze final/Hallstatt D3, 25 samples were examined by the author. The volumes of the samples taken are unknown, see table 5.10.

5.11.3 MACRO REMAINS

Botanical remains were retrieved from seven samples. The low number of remains is probably explained by the fact that the seeds were picked out by the archaeologists after sieving through large meshes (see chapter 4). Small numbers of grains of the hulled variety of six-row barley are present in four samples. The remains of wheat grains could not be identified further. Only one arable weed seed of *Vicia spec.* could be identified.

5.12 Gavisse (57)

5.12.1 INTRODUCTION

The community of Gavisse is situated in the river valley, to the west of the present course of the Moselle, halfway between the town of Thionville and the German border. A small scale excavation was carried out in 1991 by T. Klag (Collectif 1992, 52). In total, a surface of c. 500 m² was excavated. The site is located on sandy loam.

5.12.2 SAMPLES

Besides the remains of a Neolithic occupation, several Early Iron Age features were recovered. The fillings of two Hallstatt silos (13 and 15) were extensively investigated. A total number of 14 botanical samples from various layers were analysed by the author (see table 5.11).

5.12.3 MACRO REMAINS

The seed assemblage from the Gavisse silos consists of low numbers of the remains of crops and weed seeds. Millet, emmer wheat and flax, hazelnut and sloe (*Prunus spinosa*) are present. Twenty different taxa of arable weeds could be identified, dominated by various *Bromus* species.

5.13 Gondreville “site 4” (54)

5.13.1 INTRODUCTION

The site of Gondreville-Fontenoy “site 4” was excavated in 1997 under the direction of Sylvie Deffressigne. It is situated near the town of Toul, at circa 10 kilometres west of Nancy. The archaeological analysis of the site of Gondreville is still in preparation (Deffressigne et al. in prep.).

5.13.2 FEATURES

Occupation phases from the Late Bronze Age, Early Iron Age and Gallo-Roman period were attested. An extensive storage area, consisting of a remarkable dense concentration of silos, pits and granaries from the Hallstatt D period can

very well be compared to the site of Rémerschen-Schengerwis (Luxemburg, see below) (figure 5.22; see also figure 2.9).

5.13.3 SAMPLES

All Hallstatt D-features were sampled in order to conduct various different analyses. In general 10 litres of sediment were taken from all layers containing charred organic material. The majority of the samples were taken in order to collect fragments of charcoal, pottery and burnt loam. All samples were sieved by the French archaeologists on sieves with large meshes. The volume of these samples is unknown to the author. Cereal grains that were observed with the naked eye were picked out. The fillings of two pits (4214 and 4219) showed large amounts of grains and were entirely removed. The volumes of these samples are unknown to the author. In total, the two unsieved samples and nine residues from eight different archaeological features were selected for investigation (see table 5.12). The analyses were carried out by the author.

5.13.4 MACRO REMAINS

As could be expected, the samples that were not taken especially for botanical analysis produced minor results. The meshes of the sieves used were probably too large and sorting with the naked eye appeared not to be effective (see also chapter 4). The samples from structures 4214 and 4219, however, produced thousands of cereal grains and hundreds of chaff elements, dominated by six-row barley (predominantly hulled barley, see figure 5.23; the identification of some naked barley grains remains tentative), spelt wheat (grains and chaff) and einkorn.

Other crops found at the location of Gondreville are millet, flax, lentil, pea and horse bean, all in very small quantities. Some fragments of hazelnut and 19 different taxa interpreted as arable weeds were found, among which *Lapsana communis* (figure 5.23). Seven species of arable weeds were found exclusively at the location of Gondreville; these are *Adonis spec.*, *Agrostemma githago*, *Agrostis spec.*, *Buglossoides arvensis*, *Convolvulus arvensis*, *Malva sylvestris* and *Orlaya grandiflora/Pastinaca sativa* (figure 5.23). Seeds of *Veronica hederifolia* were also found (in addition to Gondreville) at the location of Yutz (see below).

5.13.5 REMARKS ON THE IDENTIFICATION

The grains of barley in sample 4214 produced considerable identification problems. “Second opinions” by D. Ku_an, K.-H. Knörzer and J. Buurman helped us to identify the barley material. In general, the specialists agreed that the majority was very clearly hulled barley. The remains of chaff on some kernels especially excluded the possibility of naked barley.

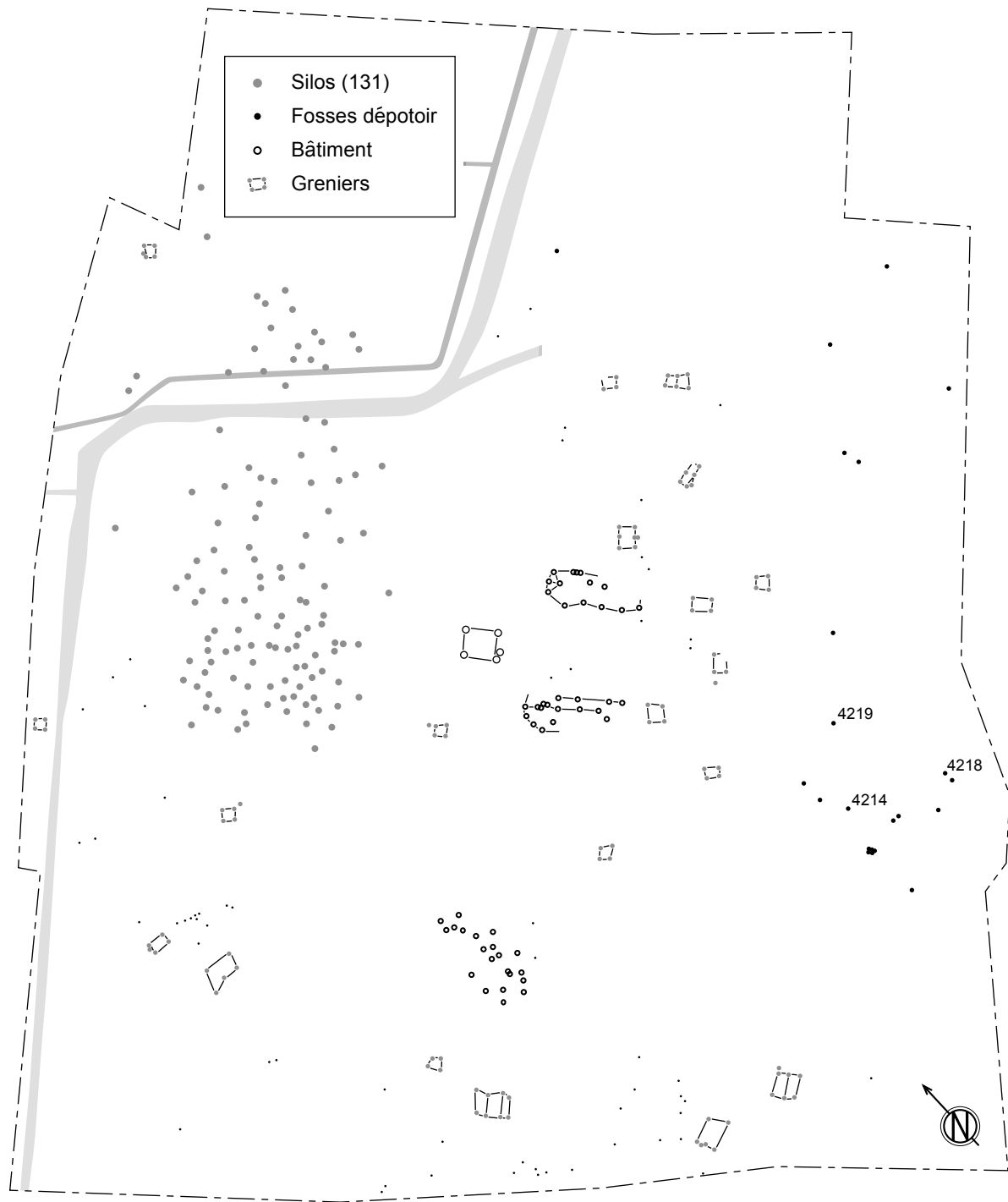


Fig. 5.22 Gondreville – part of the site

	4013	4064	4081	4110	4214	4218	4219	4219
layer	12	2	1	3?	2	2	2	3
	HaD	HaD	HaD	HaD	HaD	HaD	HaD	HaD
Hordeum vulgare (grain)	-	6	1	-	XXXXXXX	51	XXXXXX	XXXXXX
Hordeum vulgare (rachis internode)	-	-	-	-	1	-	-	-
Hordeum vulgare nudum (grain)	-	-	-	-	-	-	Xcf	Xcf
Hordeum vulgare vulgare (grain)	1cf	-	-	4	XXXXXXX	27	XX	XX
Lens culinaris	-	-	-	-	4	-	-	-
Linum usitatissimum	-	-	-	-	-	-	1	-
Panicum miliaceum (grain)	-	-	-	-	1	-	1	-
Pisum sativum	-	-	-	-	1	-	-	-
Triticum aestivum (grain)	-	1cf	-	-	-	-	-	-
Triticum dicocum (glume base)	-	-	-	-	20cf	-	-	-
Triticum monococum (glume base)	-	-	-	-	10cf	-	-	-
Triticum monococum (grain)	-	-	-	-	1120	-	XXX	XX
Triticum spec. (glume base)	-	-	-	-	XX	-	2	2
Triticum spec. (grain)	-	7	-	2	1078	-	-	-
Triticum spelta (glume base)	-	-	-	-	XXXcf	-	-	-
Triticum spelta (grain)	-	-	-	-	XXXcf	-	XXXX	XXX
Vicia faba	-	-	-	-	-	-	-	1cf
Corylus avellana	5fr	4fr	-	-	-	1fr	-	-
Adonis spec.	-	-	-	-	4	-	-	-
Agrostemma githago	-	-	-	-	50	-	1	-
Agrostis spec.	-	-	-	-	1cf	-	-	-
Avena spec.	-	-	-	-	17	-	1cf	-
Avena spec. (awn)	-	-	-	-	1kfn	-	-	-
Avena spec. (base)	-	-	-	-	1	-	-	-
Bromus secalinus-type	-	-	-	-	1	-	-	-
Bromus spec.	-	-	-	-	1	-	-	-
Bromus sterilis/tectorum	-	-	-	-	3	-	-	-
Buglossoides arvensis	-	-	-	-	8cf	-	-	-
Convolvulus arvensis	-	-	-	-	-	-	4	-
Galium aparine	-	-	-	-	9	-	21	11
Galium spurium	-	-	-	-	15	-	2	2
Lapsana communis	-	-	-	-	12	-	4	2
Malva sylvestris	-	-	-	-	9	-	-	-
Orlaya grandiflora/Pastinaca sativa	-	-	-	-	-	-	25	-
Papilionaceae	-	5	-	-	-	-	-	-
Rumex spec.	-	-	-	-	15	-	-	2
Veronica hederifolia	-	-	-	-	-	-	2	1
Vicia hirsuta/tetrasperma	-	-	-	-	22	-	5	3
Vicia spec.	-	-	-	-	5	-	5	2

Table 5.12 List of species. Gondreville "site 4"

- f or fr = fragment • cf = tentative identification • XXX = 100-1000
- ovk = waterlogged • X = 1-10 • XXXX = more than thousand
- vk = charred • XX = 10-100 • XXXXX = more than 10.000

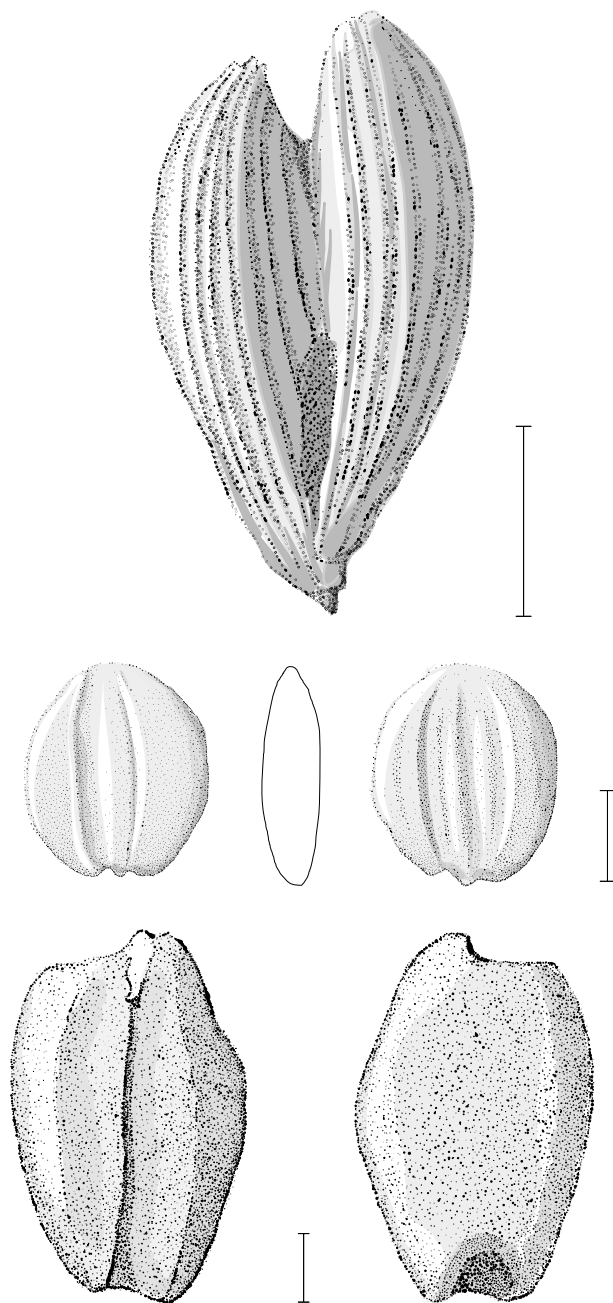


Fig. 5.23 Gondreville - site 4
 Structure 4214, couche 2: *Lapsana communis*
 Structure 4219, couche 2: *Orlaya grandiflora/Pastinaca sativa*
 Structure 4214, couche 2: *Hordeum vulgare vulgare*

The grains of wheat in sample 4219 also produced considerable identification problems. A “second opinion” by D. Kučan helped us in identifying the wheat material. It concerns, without doubt, a hulled wheat species. It was concluded that probably more than 80% of the assemblage

consists of spelt wheat. The kernels have large dimensions (length and width), some of the grains have high backs, they are slender and have a tapering apex. They are apparently not attributable to one-grain emmer wheat (Kučan pers comm).

5.14 Jouy-aux-Arches “La Machotte” (57)

5.14.1 INTRODUCTION

The construction of a *Zone Artisanale et Commerciale*, in the neighbourhood of “La Machotte”, in the community of Jouy-aux-Arches, necessitated the excavation on this location. In 1989, 30 hectares were prospected and in 1990 an archaeological excavation on a total surface of c. 2,3 hectares was carried out under the direction of Laurent Gebus (Gebus 1991). The site is situated 2 kilometres north of the agglomeration of Jouy-aux-Arches and 5 kilometres south of the town of Metz. It is located east of the river Moselle, on the Lower Terrace, which is composed of alluvial gravel covered with a thin layer of sandy loam. The zone is strongly marked by the presence of former channels, where filling up caused the preservation of the archaeological features.

5.14.2 FEATURES

At Jouy, three archaeological zones could be distinguished. In zone N (900 m²) pottery from several pits and a silo could be attributed to the later phase of the Chalcolithic. In zone A (7550 m²) a Hallstatt occupation was recovered: a three-aisled house, accompanied by a four-posted granary and (extraction) pits (figure 5.24). Structure 1005 is part of this atypical, rectangular, three-aisled Hallstatt C building. The vestibule at the east side of the house seems to have rested on a “wall” founded in the pits 1005 and 1039 (figure 5.25). The isolated structure 2059 (not on map) is a large pit (3x3 metres), interpreted as an extraction pit or a pit related to artisan activities like wool- and/or textile production. It is associated with the farmhouse and attributed to the Hallstatt C period. Zone I (1,5 hectare) comprises a necropolis, in use in three phases (Bronze Ancien A2, Hallstatt/LaTène and the Gallo-Roman period).

5.14.3 SAMPLES

For the purpose of this study, five soil samples were selected for botanical investigation. Three of the Chalcolithic (*campaniforme*) pits and silos were investigated and two features of the Hallstatt domestic complex were studied. The analyses were carried out by the author and J. Goudzwaard. The volume for each sample is given in table 5.13.

5.14.4 MACRO REMAINS

Two of the *Campaniforme* samples (4002 and 4012) did not yield any seeds. The material from silo 4011 from this same

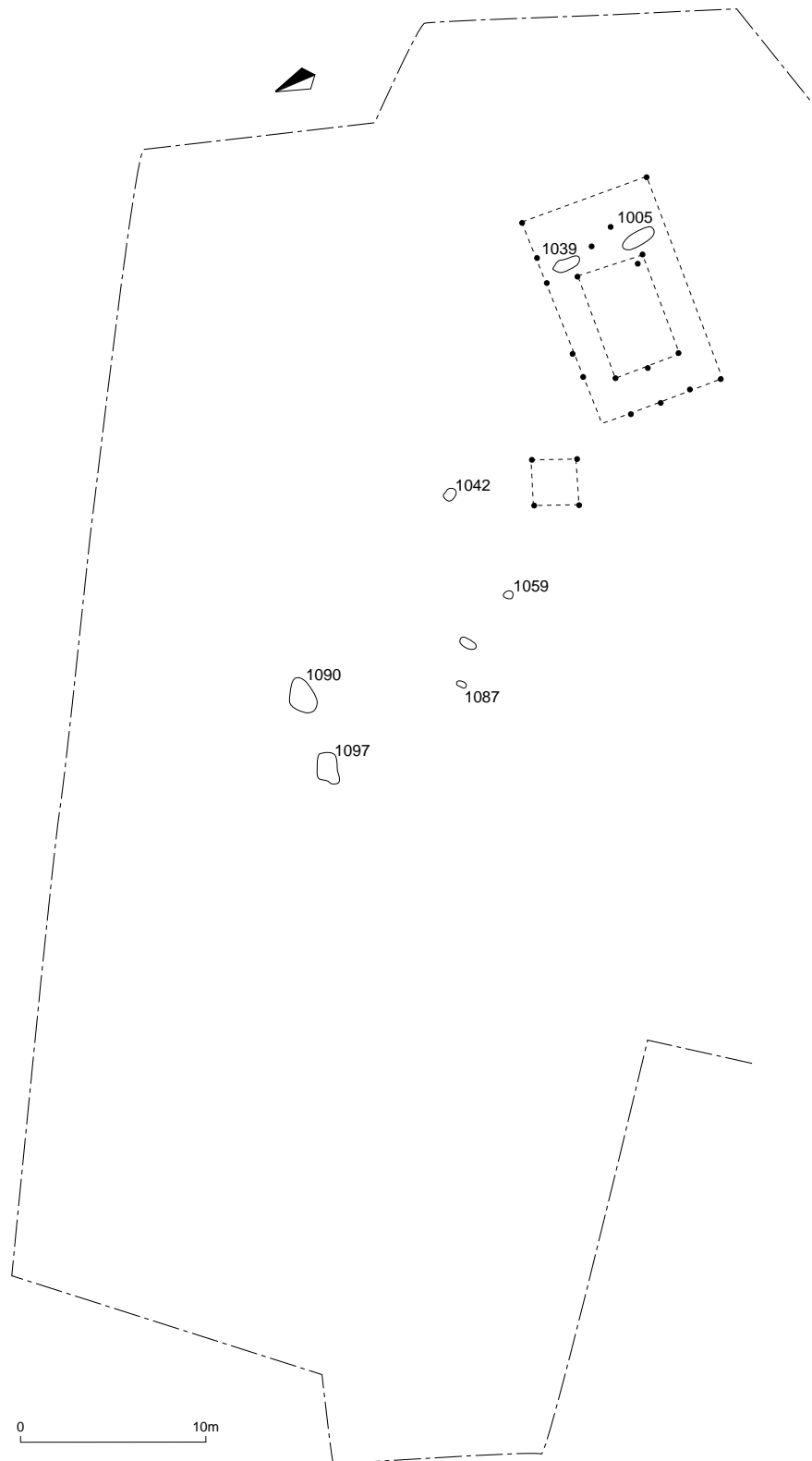


Fig. 5.24 Jouy-aux-Arches - Hallstatt

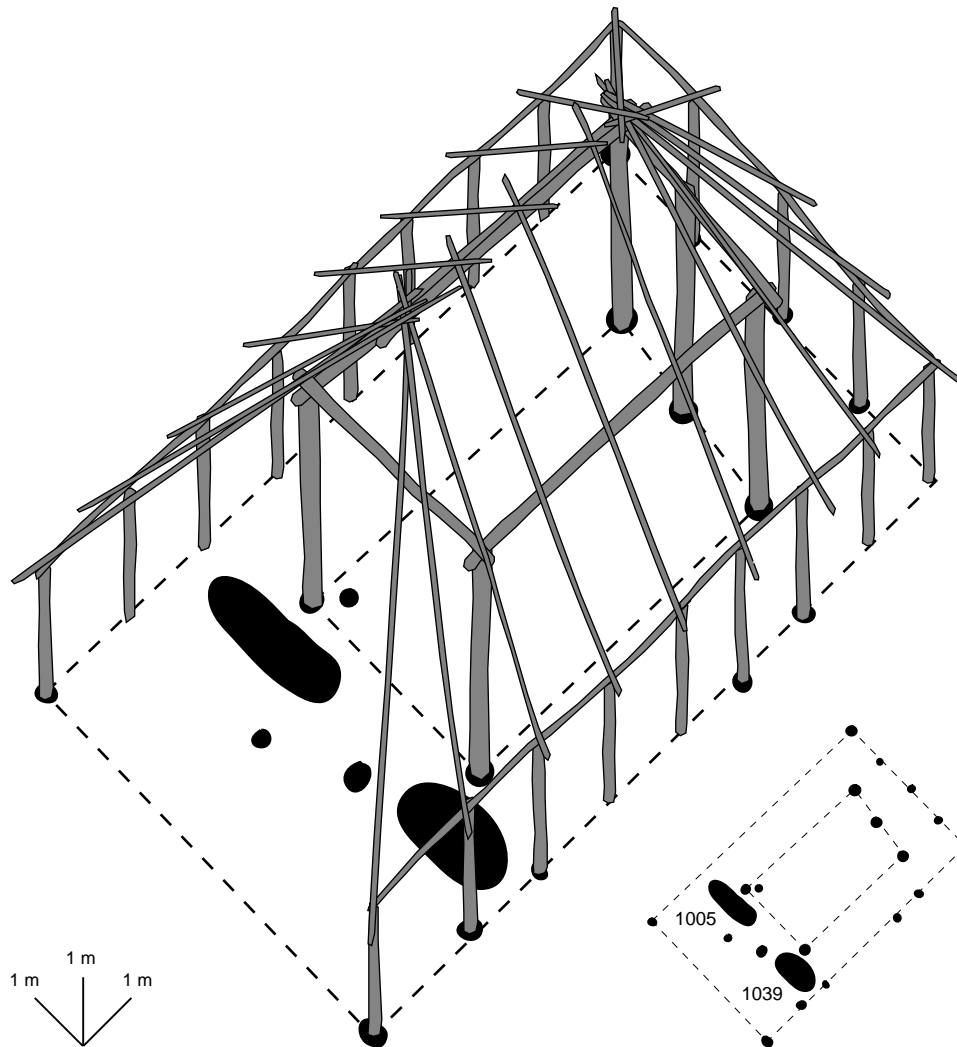


Fig. 5.25 Jouy-aux-Arches - Hallstatt, house 1005 and reconstruction

period consists solely of the remains of wild, collected plants: hazelnut, sloe and elder. The two Hallstatt pits (1005 and 2059) produce relatively large quantities of botanical remains. Remains of emmer wheat, spelt wheat, einkorn and six-row barley as well as grains of millet and gold-of-pleasure are present. The identification of grains of Italian millet (*Setaria cf. italica*) remains tentative (figure 5.26). 15 taxa of arable weeds were identified in the Hallstatt samples. Charred apples were said to have been observed during the excavation, but were never recovered by the author.

5.15 Marly “Le Clos des Sorbiers” (57)

5.15.1 INTRODUCTION

The site of Marly “Le Clos des Sorbiers” is situated in the valley of a small stream “Le Grand Bousseux”. Its location

is at a distance of approximately 4 kilometres from the present course of the river Moselle and 650 metres from the present course of the river Seille. The sediments consist of sand, covered with loam. The distribution of lime concretions (*poupées de loess*) evidences the former presence of löss, which has been eroded. After the first prospectings in 1987 over a surface of 12 hectares (only 3% was investigated), large-scale excavations were carried out in 1988 and 1990 under the direction of Thierry Klag (Klag 1990).

5.15.2 FEATURES

Evidence for Neolithic (Michelsberg), Late Bronze Age, Iron Age and Roman occupation was present at “Le Clos des Sorbiers”. During the Late Bronze Age the occupation appears to be quasi-continuous, as six out of ten regional

	1005 HaC	2059 HaC	4011 Campaniforme finale?
volume (L.)	2	2	4
Camelina sativa	2	-	-
Cerealia	18	12	-
cf. Setaria italica/verticillata	-	9	-
Hordeum vulgare (grain)	1	-	-
Hordeum vulgare (rachis internode)	7	1	-
Panicum miliaceum (grain)	45	2	-
Triticum dicoccum (glume base)	45	-	-
Triticum dicoccum/spelta (grain)	9	-	-
Triticum monococcum (grain)	2	-	-
Triticum spec. (glume base)	-	2	-
Triticum spelta (glume base)	7	-	-
Corylus avellana	-	-	16
Prunus spinosa	-	-	15
Avena spec.	4	-	-
Avena spec. (awn)	4	-	-
Bromus spec.	16	6	-
Chenopodium album	65	3	-
Echinochloa crus-galli	3	-	-
Fallopia convolvulus	1	-	-
Festuca/Lolium spec.	-	1	-
Galium aparine	-	1cf	-
Lotus/Trifolium spec.	3	-	-
Plantago lanceolata	1	-	-
Poa annua/Phleum spec.	140	2	-
Poa trivialis/pratensis	1	-	-
Rumex acetosella	1	-	-
Rumex spec.	2	1	-
Sambucus spec.	-	-	1
Scleranthus annuus	1	-	-

Table 5.13 List of species. Jouy-aux-Arches

- f or fr = fragment • cf = tentative identification • XXX = 100-1000
- ovk = waterlogged • X = 1-10 • XXXX = more than thousand
- vk = charred • XX = 10-100 • XXXXX = more than 10.000

chronological phases were present. The *phase moyenne du Bronze final*, phase 6 of the regional chronology (Hallstatt A2/B1, 1000-950 BC) is well represented by several pits (e.g. 1171) and the building 1117. Granary 1053 is associated with this ensemble. Among others, the structures 1000, 1001 and 1003 are attributed to phase 7 of the regional typochronology (=Hallstatt B1, 950-900 BC). A more or less complete Late Bronze Age settlement was, thus, recovered: a farm house, accompanied by pits, a well, granaries and silos. Based on the relatively small number of storage structures, it is estimated that a family of five to ten persons inhabited this settlement (Klag 1990). The La Tène period is also present at this site, but these features can not be dated more accurately.

5.15.3 SAMPLES

For the botanical analyses, 27 samples were selected. From the Late Bronze Age house (1117), 15 out of the 18 post-holes were investigated. From the La Tène building (1142), 5 out of the 6 postholes were investigated. An additional 7 samples from various Late Bronze Age pits and silos and a Late Hallstatt silo (1140) were analysed. The analyses were carried out by the author. The volume for each sample is given in table 5.14.

5.15.4 MACRO REMAINS

Out of 27 samples, 18 yielded charred macro remains. The seed assemblages consisted of very small quantities of cereal grain (barley, wheat and millet) and weed seeds. One grain of six-row barley from a Late Bronze Age context possibly belongs to the naked variety. Very low numbers of different taxa of weed seeds could be identified (eight from the Early Bronze Age contexts; seven from the La Tène contexts).

5.16 Rettel “Chemin de Sierck” (57)

5.16.1 INTRODUCTION

The location of Rettel “Chemin de Sierck” (department of Moselle) is situated 30 kilometres north of the town of Metz, close to the Luxemburgian border. The site is located in the valley, 600 metres east of the present course of the river Moselle, situated on the contact zone between the slope debris of the *côte* (cuesta) of the Moselle and the ancient fluvial deposits covered with loam. The slope of the terrain is 5 to 6% to the north. Pierre Buzzi and Vincent Blouet directed the excavations (Blouet/Buzzi 1993). After the archaeological prospection, a selected part of the site (the planned access roads) was excavated in 1991 (zone D). In 1993 a second campaign was carried out in zones A, B and C. The large time lapse between the two campaigns complicated the archaeological interpretation and analysis. A total surface of 0,7 hectare was investigated.

5.16.2 FEATURES

At the site of Rettel “Chemin de Sierck”, a very dense concentration of archaeological features was recovered. The excavation revealed evidence of the following periods: Late Neolithic (*Campaniforme*), Bronze Age (Bronze D- Hallstatt A2/B1), Iron Age (La Tène C/D) and the Roman period. The Late Bronze Age is best represented at this location with at least 34 structures, 12 of which can be attributed more accurately to the Hallstatt B1 period (950-900 BC). The numerous silos, “vase-silos” (underground storage vessels) and granaries seem to make up a relatively important agrarian or storage unity comparable to those of Gondreville (see above) and Rémerschen (see below), although the one of Rettel is older and considerably smaller. The storage facilities must have been related to a habitation area which was not found

	1118	1119	1120	1121	1122	1124	1181	1187	1188	1190	1193	1145	1147	1000	1001	1003	1135	1171
	BfIIIb	BfIIIb	BfIIIb	BfIIIb	BfIIIb	BfIIIb	BfIIIb	BfIIIb	BfIIIb	BfIIIb	BfIIIb	La Tene	La Tene	BfIIIb	BfIIIa	BfIIIb	BfIIIb-IIIa	Bf
volume (L.)	?	?	?	?	?	?	?	?	?	?	?	?	5,5	0,5	0,5	0,5	0,5	0,5
Cerealia	1	2	40f	-	1	1	7f	-	2	5	3	4	1	-	-	-	-	-
Hordeum vulgare (grain)	-	-	-	1	-	-	3	1	-	-	-	-	-	-	-	-	-	-
Hordeum vulgare cf. nudum	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hordeum/Triticum (grain)	-	-	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Panicum miliaceum (grain)	-	-	-	-	-	-	-	-	1	-	-	2	-	-	-	-	-	-
Triticum spec. (grain)	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	1	-	-
Atriplex patula	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-
Atriplex spec.	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-
Bromus secalinus-type	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
cf. Juncus spec	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
Chenopodiaceae	-	-	-	-	-	-	3	-	3	-	-	-	-	-	+	-	-	-
Chenopodium album	1	-	-	-	-	-	-	1	-	-	-	-	2	-	2	-	1	-
Fallopia convolvulus	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
Galium aparine	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
Gramineae	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
Papilionaceae	-	-	-	-	-	-	-	-	-	-	-	-	-	3	+	-	-	-
Persicaria lapathifolium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Persicaria maculosa	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
Polygonum aviculare	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Solanum nigrum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1

Table 5.14 List of species. Marly "Le Clos des Sorbiers"

- f or fr = fragment • cf = tentative identification • XXX = 100-1000
- ovk = waterlogged • X = 1-10 • XXXX = more than thousand
- vk = charred • XX = 10-100 • XXXXX = more than 10.000

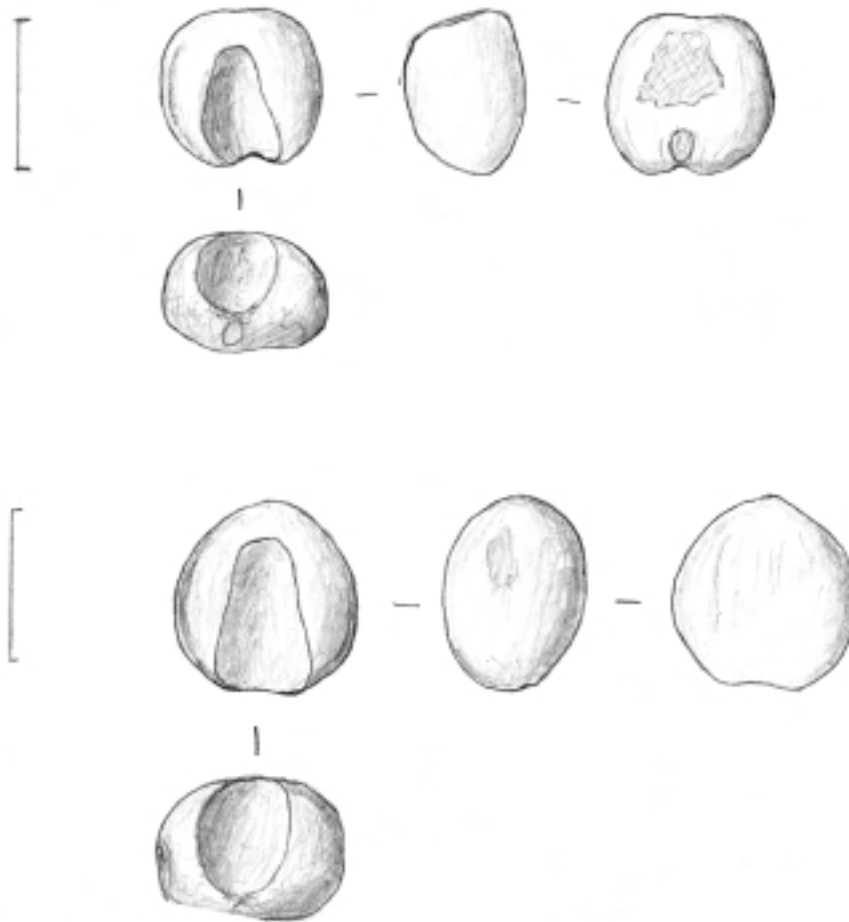


Fig. 5.26 Jouy-aux-Arches - Structure 1059: *Setaria italica*

itself as it was either situated outside the excavated terrain or eroded (figure 5.27). The site demonstrates the (re-) introduction of the phenomenon of the underground silo in the later metal ages. This type of storage structure was known from Neolithic and Early Bronze Age times, seems to be abandoned in the course of the Middle Bronze Age and to re-appear in the Bronze final period.

5.16.3 SAMPLES

For the purpose of this study, the author examined the botanical material from ten Late Bronze Age features: eight silos, one vase-silo and one pit. Some of the features could be dated very accurately in the Hallstatt B1 period (950-900 BC), some were dated in the Late Bronze Age (1250-900 BC). Out of these ten features, 17 samples were analysed.

Individual layers within structures were separately sampled, but, as little difference existed between the assemblages from the different layers, the results were added up in the list. The volume for each sample is given in table 5.15.

5.16.4 MACRO REMAINS

Sample 108 (from the filling of a vase-silo) did not produce any seeds. The remaining samples contained small quantities of seeds. Low numbers of (some hulled) six-row barley, millet and emmer wheat (grains and chaff) were found. Three different pulses were identified: lentil, pea and horse bean. In one sample, a single seed of flax was present. A specimen of *Setaria glaucalitalica* in a Bronze final pit (223) could well be of the cultivated Italian millet species. Fourteen different weed taxa are present in low numbers.

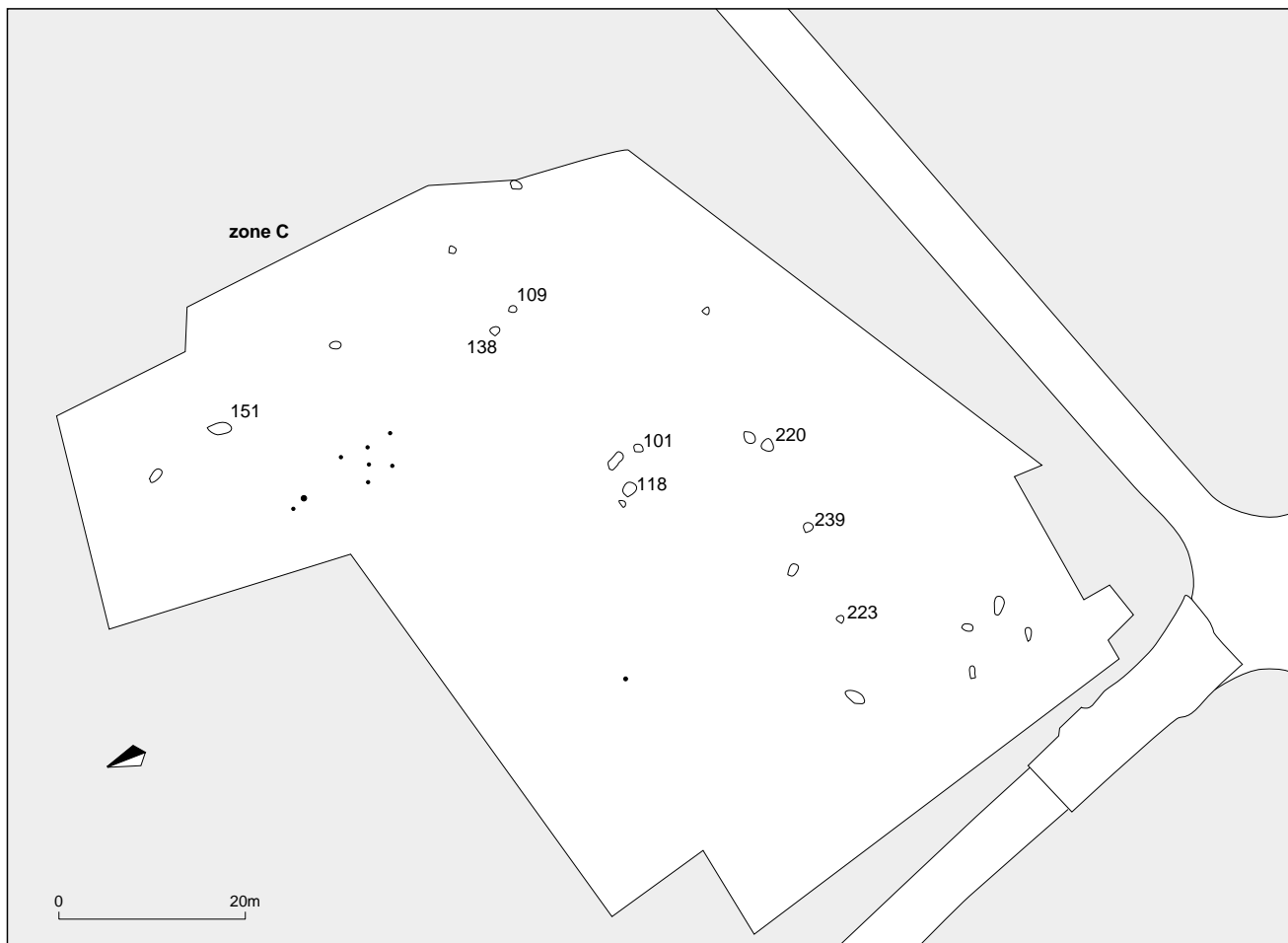


Fig. 5.27 Rettel - Bronze final

5.17 Trémery/Flévy “Massey Fergusson” 1995 (57)

5.17.1 INTRODUCTION

The site of “Massey Fergusson” is part of the large project Trémery/Flévy “Z.A.C. de la Fontaine des Saints” (see also below) and one of the 25 important archaeological zones distinguished in this project. It is situated in the communities of Flévy and Trémery, circa 15 kilometres north of Metz, east of the present river course of Moselle situated on loam. The prospective investigations at the site “Massey Fergusson” were carried out in 1995 (Petitdidier 1995). The analysis and publication of the archaeological excavation are still in preparation.

5.17.2 FEATURES AND SAMPLES

The majority of the archaeological features can be attributed to the transitional period Hallstatt C — La Tène. For the purpose of this study, 82 samples from six buildings (51, 103, 123/125, 194, 214 and 325) and five indi-

vidual structures were selected for botanical investigation. The analyses were carried out by the author (table 5.16). Sample volumes are unknown.

5.17.3 MACRO REMAINS

Out of the investigated material, 56 samples did not yield any botanical remains. The samples from building 214 did not produce any seeds. From the remaining buildings, 26 samples contained small numbers of plant remains. An internode and grains of barley (some of which could be ascribed to the hulled variety), as well as grains and chaff of emmer wheat and grains of einkorn were identified. One seed of elder and very low numbers of 11 different taxa of arable weeds were recovered.

5.17.5 REMARKS ON THE IDENTIFICATION

In general, the seeds were poorly preserved. The cereal grains were especially strongly corroded and therefore

	101 HaB1	102 HaB2	109 HaB1	118 HaA2- B1	138 HaB1	151 HaB1	220 Bf	223 Bf	239 Bf
volume (L.)	5	10	6	?	4	2	2	2	2
Cerealia	2	28	6	3	2	8	5	10	5
Hordeum vulgare (grain)	1	1	-	-	-	-	-	-	-
Hordeum vulgare vulgare (grain)	-	-	-	-	1	-	-	-	-
Lens culinaris	-	5	-	-	-	2	-	-	-
Linum usitatissimum	-	1	-	-	-	-	-	-	-
Panicum miliaceum (grain)	-	10	-	-	-	-	-	-	-
Pisum sativum	-	-	-	-	-	1	-	-	-
Setaria glauca/italica	-	-	-	-	-	-	-	1	-
Triticum dicoccum (glume base)	-	11	1	1	-	-	-	1	-
Triticum dicoccum (grain)	2	-	-	3	-	-	-	-	-
Triticum spec. (glume base)	-	-	1	-	-	-	-	1	-
Triticum spec. (grain)	-	1	-	-	-	-	-	-	-
Triticum/Hordeum (grain)	1	8	1	-	-	2	-	-	-
Vicia faba	-	3	-	-	-	1	-	-	-
Atriplex patula/prostrata	-	4	-	-	-	-	-	-	-
Bromus secalinus-type	-	1	-	-	-	-	-	-	-
Cerastium spec.	-	1	-	-	-	-	-	-	-
Chenopodiaceae	1	-	-	-	-	-	-	-	-
Chenopodium album	1	17	2	5	-	11	-	-	-
Chenopodium hybridum	-	-	-	-	-	1	-	-	-
Fallopia convolvulus	1	8	-	-	1	3	-	-	-
Galium spurium	-	-	-	-	-	-	-	1	-
Gramineae	-	1	-	-	-	-	-	-	-
Leucanthemum vulgare	-	-	-	-	-	-	-	1	-
Scirpus setaceus	-	-	-	-	-	1	-	-	-
Thlaspi arvense	-	1	-	-	-	-	-	-	-
Vicia spec.	-	6	2	-	-	-	-	-	-
Vicia tetrasperma	-	-	-	-	-	10	-	-	-

Table 5.15 List of species. Rettel "Chemin de Sierck"

- f or fr = fragment • cf = tentative identification • XXX = 100-1000
- ovk = waterlogged • X = 1-10 • XXXX = more than thousand
- vk = charred • XX = 10-100 • XXXXX = more than 10.000

difficult to identify more accurately than *Triticum spec.*, *Triticum/Hordeum* or *Cerealia*.

5.18 Ennery/Flévy/Trémery "Voirie"- Site 4 (57)

5.18.1 INTRODUCTION

In 1994 a major project of an industrial zone "Z.A.C. de la Fontaine des Saints" of a total of 97 hectares was begun, situated in the communities of Flévy and Trémery, 15 kilometres north of Metz. It is located next to the industrial zone of Ennery, where c.40 archaeological sites had already been established, the most important of which were excavated in previous years (see above, Ennery Kléber and Ennery Solotra). In 1995 a prospective investigation was carried out on the site of the "Z.A.C. de la Fontaine des Saints" to estimate the archaeological value of the terrain. In total, 25 important

archaeological zones were distinguished, dating from the Early Neolithic to the Middle Ages. So far, only some of these sites have been completely excavated, and the majority of them only partially. In 1995, the sites located on the network of roads were examined (sites 1 and 3-8) (Petitdidier et al. 1999). As a corollary, no complete settlement sites were excavated. The borders of specific occupation units cannot be indicated, as they have not yet been reached. These conditions hamper the analysis of the excavations and an overview of the history of occupation. The excavated sites are situated at 3 kilometres to the east of the river Moselle, on the south slope and the bottom of a large valley perpendicular to the valley of the Moselle. The subsurface is composed of marl, alternated by thin and often fragmented limestone layers covered by loam. Site 4 stretches along the north border of

	195	233	327	328	330	331	332	339	347	509	37	120	122	85
	HaC-	HaC-	HaC-	HaC-	HaC-	HaC-	HaC-	HaC-	HaC-	HaC-	HaC-	HaC-	HaC-	HaC-
	La Tene	La Tene	La Tene	La Tene	La Tene	La Tene	La Tene	La Tene	La Tene	La Tene	La Tene	La Tene	La Tene	La Tene
Cerealia	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hordeum vulgare (grain)	1	1	-	2	-	-	1	-	1	1	1	-	1	-
Hordeum vulgare (rachis internode)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hordeum vulgare vulgare (grain)	-	-	2	-	-	1	-	-	-	-	-	-	-	-
Hordeum vulgare vulgare (glume base)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum dicoccum (grain)	-	-	-	1	1	-	-	-	-	8	-	-	-	-
Triticum monococcum (grain)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum spec. (grain)	-	-	-	-	-	-	-	1	-	10	-	1	-	1
Triticum/Hordeum (grain)	-	-	-	-	-	1	-	1	-	-	-	-	-	-
Atriplex patula/prostrata	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Atriplex spec.	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Avena spec.	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chenopodium album	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chenopodium cf polyspernum	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chenopodium spec.	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Galium aparine	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gramineae	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polygonum aviculare	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rumex spec.	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sambucus spec.	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vicia hirsuta/tetrasperma	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 5.16 List of species. Trémery/Fiévy "Massey Ferguson"

- f or fr = fragment
- cf = tentative identification
- XXX = 100-1000
- ovk = waterlogged
- X = 1-10
- vk = charred
- XXXX = more than thousand
- XXXXX = more than 10.000
- XX = 10-100

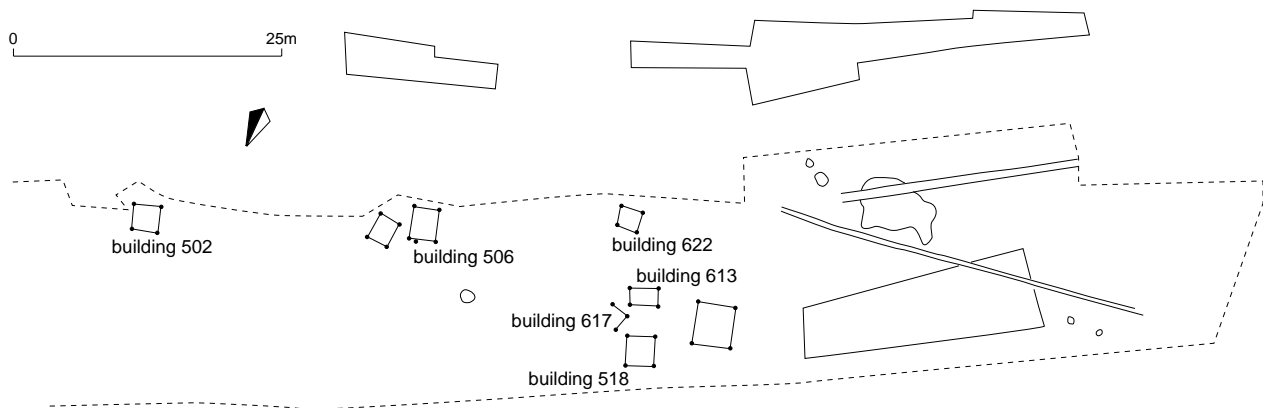


Fig. 5.28 Ennery/Flévy/Tremery - part of site

	506 HaC/D1	507 HaC/D1	508 HaC/D1	518 BfIIIb- HaD	519 BfIIIb- HaD	618 BfIIIb- HaD	619 BfIIIb- HaD	613 BfIIIb- HaD	616 BfIIIb- HaD	617 ?	621 ?	622 BfIIIb- HaD	623 BfIIIb- HaD
Cerealia	-	-	9	-	-	-	-	-	1	-	-	5	-
Hordeum vulgare (grain)	1	-	2	8	-	-	1	-	-	-	29	-	-
Hordeum vulgare (rachis internode)	-	-	1	-	-	-	-	-	-	-	-	-	-
Hordeum vulgare vulgare (grain)	-	-	-	-	6	45	-	-	-	-	-	5	110
Panicum miliaceum (grain)	-	1	-	-	-	-	-	1	-	-	-	-	-
Triticum dicoccum (glume base)	-	1cf	1	2	-	-	-	-	-	-	-	-	-
Triticum dicoccum (grain)	-	-	-	-	1	-	-	-	-	-	-	1	-
Triticum spec. (grain)	-	-	2	9	-	-	3	-	-	-	-	-	-
Triticum spec. (spikelet fork)	-	-	-	-	-	-	-	-	-	1	-	-	-
Triticum/Hordeum (grain)	-	-	-	20	5	-	6	-	-	-	-	-	-
Brassica cf. campestris	-	-	-	-	-	-	-	-	-	-	-	1	-
Chenopodium album	-	-	-	1	1	-	1	-	-	1	-	-	1
Fallopia convolvulus	-	-	-	1	-	-	-	-	-	-	-	-	-

Table 5.17 List of species. Ennery/ Flévy/Trémery "Voirie" site 4

- f or fr = fragment • cf = tentative identification • XXX = 100-1000
- ovk = waterlogged • X = 1-10 • XXXX = more than thousand
- vk = charred • XX = 10-100 • XXXXX = more than 10.000

the excavated terrain (figure 5.28). The excavated part represents only a small part of a larger sector densely covered with features, that stretches out onto zone 32.

5.18.2 FEATURES

The combination of the results of the prospection of zone 32 and the excavation of site 4 enabled the archaeologists to provisionally demonstrate several phases of occupation of the terrain from the Late Bronze Age (I or IIa) at least to the end of the Early Iron Age. On site 4, which is completely excavated, no trace of the early stages of the Late Bronze Age could be demonstrated. On the contrary, a pit and six granaries in this part of the site produced material that could

be dated to the end of the Bronze final period or to the beginning of the Early Iron Age (Bronze final IIIb-Hallstatt D). Also various other pits excavated in site 4 correspond to this more recent occupation in the Hallstatt final period. These traces represent only a small part of the complex, the remaining parts of which are probably to be found, or at least part of them, in zone 32. In order to confirm the chronology, a future archaeological excavation of zone 32 is regarded as necessary.

5.18.3 SAMPLES

From the postholes of the six granaries dating from the transitional period Bronze final IIIb-Hallstatt D (502, 518,

613, 617, 622) and Hallstatt C-D1 (506), 21 samples were retrieved. The analysis of the botanical material was carried out by the author. The volumes of the samples are unknown (see table 5.17).

5.18.4 MACRO REMAINS

Out of the 21 investigated samples, 13 yielded botanical material. Three crops could be identified: barley grains (the principal part of which could be attributed to the hulled variety), emmer wheat (grains and chaff) and millet. Three different arable weeds were found.

5.19 Woippy (57)

5.19.1 INTRODUCTION

The excavation in the community of Woippy, in the neighbourhood “Pollieux” (department of Moselle) was carried out by the Service Régional de l’Archéologie de Lorraine, under the direction of Pierre Buzzi. The first archaeological features (important Late Bronze Age and Early Iron Age occupation phases) were discovered in 1993 during prospective investigations which preceded the extension of the sandpit *Hergott* over a surface of 7 hectares. Rescue excavations took place in 1994 and were completed in 1995 (Buzzi 1998). The site of Woippy is situated in the periphery north-west to the city of Metz, at a distance of c. 1 kilometre from the old city centre, 2,5 kilometres to the west of the present river Moselle. The site is located on the Lower Terrace, of which the sediment is composed of sandy gravel, covered with loam. The archaeological features all touch the sandy layers. In total, a surface of c. 3 hectares was excavated extensively, during three successive years, a time lapse that caused reasonable problems (re-) detecting the surviving archaeological features.

5.19.2 FEATURES AND SAMPLES

To date, only one sample from structure 111 has been selected for investigation. The interpretation of this structure remains uncertain; it is dated La Tène C-D. Six litres of sediment were sieved through a sieve with meshes of 0,5 mm. The sample was analysed by the author (see table 5.18).

5.19.3 MACRO REMAINS

The botanical analysis of the La Tène sample produced the following results: grains of naked barley and the chaff remains of spelt wheat dominate the crop assemblage. Also grains of spelt wheat, hulled barley and millet and fragments of charred acorns are present. The identification of lentil remains tentative. The seeds of *Setaria* could possibly be of the cultivated species, i.e. *Setaria italica*. Relatively large numbers of seeds of ten different weed taxa are found.

111
filling of pot or oven
6
La Tène C/D

volume (l.)	
	Cerealia
	Hordeum vulgare (grain)
	Hordeum vulgare nudum (grain)
	Hordeum vulgare vulgare (grain)
	Lens culinaris
	Panicum miliaceum (grain)
	Setaria glauca/italica
	Triticum spelta (glume base)
	Triticum spelta (grain)
	Quercus spec.
	Bromus secalinus-type
	Chenopodium album
	Fallopia convolvulus
	Galium aparine
	Galium cf. spurium
	Gramineae
	Lapsana communis
	Persicaria lapathifolium
	Rumex spec.
	Vicia hirsuta/tetrasperma

Table 5.18 List of species. Woippy “Hergott”

- f or fr = fragment
- cf = tentative identification
- XXX = 100-1000
- ovk = waterlogged
- X = 1-10
- XXXX = more than thousand
- vk = charred
- XX = 10-100
- XXXXX = more than 10.000

5.20 Yutz “Tracé du Contournement sud-est”, sites 13, 15 and 17 (57)

5.20.1 INTRODUCTION

In 1994 and 1995, large scale excavations took place in the community of Yutz (Moselle), because of extensive traffic works projects, i.e. the construction of a road plan with a length of 6,5 kilometres. The excavator responsible for the archaeological project was Thierry Klag. The site is situated 2 kilometres to the east of the town of Thionville and the present course of the river Moselle. A total surface of c. 35 hectares was prospected, and twelve (sub-) sites or remains of occupation were distinguished on the track of the road plan (Klag 1998, 11). Eventually, a surface of 38000 m² was laid open.

5.20.2 FEATURES

The locations relevant to this study are the sites 13, 15 and 17, situated closest to the valley of the Moselle. Site 13 is flat, without any important slope. The terrain is at present covered by 60 cm of loam. In total, 3700 square metres were excavated. Various features, mainly pits and postholes, dating from the Bronze final IIIa point to an earli-



Fig. 5.29 Yutz - Iron Age

est occupation of the site in this period. Large features, probably loam extraction pits (1300 and 1302) and a silo (1301) are related to this earliest phase. The nearby postholes 1303, 1304 and 1308 and various other pits (like 1310) are probably also related to these structures and the occupation phase. Site 15 and 17 are situated in the Moselle river valley (figure 5.29). In this sector, height differences are of no importance. The substratum in this sector is homogeneous and composed of fluvial gravel, belonging to the Lower Terrace of the Moselle, covered with a thin layer of loam. In site 15, c.

5760 m² were excavated. In site 17, c. 1350 m² were excavated. A considerable part of an Iron Age settlement was excavated in site 15. Some structures, especially structure 1320, had suffered from severe erosion. The two sites are dominated by traces of occupation dating from the end of the Early Iron Age (Hallstatt D). A pit and seven silos represent this occupation phase, divided into two concentrations, possibly two different units of successive occupation. Four granaries (HaD2/D3) also belong to this agrarian complex, as well as silo 1358, discovered in site 17.

	1303 BfIIIa	1305 Ha	1306 BfIIIa	1307 BfIIIa	1308 BfIIIa	1309 Ha	1336 HaD2/ D3	1343 HaD2/ D3	1345 HaD2/ D3	1333 HaD2/ D3	1351 HaD2/ D3	1352 HaD2/ D3	1353 HaD2/ D3
volume (L.)	2	3	2	2	2	1	6	4,5	4,5	4,5	4,5	4,5	4,5
Camelina sativa	-	-	-	-	-	-	-	-	-	-	1	-	-
Cerealia	3	3	3	-	7	1	5	6	-	10	1	-	5
Hordeum vulgare (grain)	1	-	-	-	1	-	-	1	-	-	1	-	-
Hordeum vulgare (rachis internode)	-	-	3	-	-	-	-	-	-	-	-	-	-
Hordeum vulgare vulgare (grain)	-	-	10	-	-	-	-	-	-	-	-	-	-
Hordeum/Triticum (grain)	-	-	-	-	-	-	-	-	-	-	-	-	-
Lens culinaris	1	-	-	-	-	-	-	-	-	-	-	1	3
Linum usitatissimum	-	-	-	-	-	-	-	-	-	-	-	1	-
Panicum miliaceum (grain)	-	-	3	-	1	-	-	-	-	-	2	20	14
Triticum dicoccum (glume base)	1	-	13	1 cf	-	-	-	-	-	-	-	-	-
Triticum dicoccum (grain)	-	-	-	-	1	-	-	-	-	-	-	-	-
Triticum spec. (glume base)	-	-	-	-	-	-	-	-	-	-	-	-	-
Triticum spec. (grain)	-	-	-	-	-	1	-	-	-	-	-	-	-
Triticum/Hordeum (grain)	-	1	-	-	-	-	-	1	-	-	-	12	31
Vicia faba	-	-	-	-	-	-	-	-	-	-	-	-	-
Quercus spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Atriplex patula/prostrata	-	-	-	-	-	-	-	-	-	-	-	-	-
Avena spec. (awn)	-	-	-	-	-	-	-	-	-	-	-	-	2
Bromus secalinus-type	-	-	-	-	-	-	-	-	-	-	-	-	-
Chenopodium album	-	-	-	-	-	-	-	-	-	3	-	10	6
Chenopodium ficifolium	-	-	-	-	-	-	-	-	-	-	-	-	-
Chenopodium spec.	-	-	-	-	-	-	-	1	-	-	-	-	-
Echinochloa crus-galli	-	-	-	-	-	-	-	-	-	-	-	-	-
Eleocharis palustris	-	-	-	-	-	-	-	-	-	1	-	-	1
Fallopia convolvulus	-	-	-	-	1	-	-	-	-	-	-	-	-
Galium aparine	-	-	-	-	-	-	-	-	-	-	-	-	-
Galium spurium	-	-	-	-	-	-	-	-	-	-	-	2	4
Galium spurium/aparine	-	-	-	-	-	-	-	-	-	1	-	-	-
Galium verum	-	-	-	-	-	-	-	-	-	-	-	-	-
Gramineae	-	-	-	-	-	-	-	-	-	-	-	-	-
Hieracium spec.	-	-	-	-	-	-	-	-	-	-	-	1	-
Lapsana communis	-	-	-	-	-	-	-	-	-	-	-	-	-
Leucanthemum vulgare	-	-	-	-	-	-	-	-	-	-	-	-	-
Linum catharticum	-	-	-	-	-	-	-	-	-	-	-	-	-
Matricaria maritima	-	-	-	-	-	-	-	-	-	-	-	-	2
Myosotis spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Odontites spec.	-	-	-	-	-	-	-	-	-	-	-	-	-
Papaver setigerum	-	-	-	-	-	-	-	-	-	-	-	3	-
Papilionaceae	-	-	-	-	-	-	-	-	-	1	-	-	-
Poa annua	-	-	-	-	-	-	-	-	-	-	-	-	-
Poa spec.	-	-	2	-	-	-	-	-	-	-	-	-	2
Polygonum aviculare	-	-	-	-	-	-	-	-	-	-	-	-	-
Polygonum spec.	-	1	-	-	-	-	-	-	-	1	-	-	-
Prunella vulgaris	-	-	-	-	-	-	-	-	-	-	-	-	-
Raphanus raphanistrum	-	-	-	-	-	-	-	-	-	-	-	-	-
Rumex acetosella	-	-	-	-	-	-	-	-	-	-	-	1	1
Rumex crispus-type	-	-	-	-	-	-	-	-	-	-	-	-	-
Rumex spec.	-	-	-	-	-	-	-	-	-	-	-	-	1
Scleranthus annuus	-	-	-	-	-	-	-	-	-	-	-	-	1
Silene spec.	-	-	1	-	-	-	-	-	-	-	-	-	-
Trifolium-type	-	-	-	-	-	-	-	-	-	1	1	2	2
Umbelliferae	-	-	-	-	-	-	-	-	-	-	-	-	-
Veronica hederifolia	-	-	1	-	-	-	-	-	-	-	-	-	-
Vicia hirsuta/tetrasperma	-	-	-	-	-	-	-	-	-	-	1	1	-
Vicia lathyroides	-	-	-	-	-	-	-	-	-	-	-	-	-
Vicia spec.	-	-	-	3	-	-	-	-	-	-	-	3	3
Vicia tetrasperma	-	-	-	-	-	-	-	-	-	1	-	-	-
Vicia/Lathyrus	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 5.19 List of species. Yutz contournement 1995 sites 13-15-17

- f or fr = fragment • cf = tentative identification • XXX = 100-1000
- ovk = waterlogged • X = 1-10 • XXXX = more than thousand
- vk = charred • XX = 10-100 • XXXXX = more than 10.000

	1301	1302	1310	1320	1321	1322	1323	1325	1358
	BfIIIa	BfIIIa	BfIIIa	HaD1/ D2	HaD1/ D2	HaD1/ D2	HaD1/ D2	HaD1/ D2	proto (BA/IA)
volume (L.)	3	3	4,5	7,5	9	6	9	7	7,5
Camelina sativa	-	-	-	-	-	-	-	-	-
Cerealia	XXX	23	1	-	225	13	6	2	12
Hordeum vulgare (grain)	1	2	-	-	17	-	-	1	-
Hordeum vulgare (rachis internode)	-	-	-	-	-	-	-	-	-
Hordeum vulgare vulgare (grain)	-	-	-	-	-	1	-	-	3
Hordeum/Triticum (grain)	-	10	-	-	-	-	2	-	-
Lens culinaris	9	-	-	-	-	4	-	-	-
Linum usitatissimum	-	-	-	-	-	-	-	-	-
Panicum miliaceum (grain)	13	4	-	-	98	-	-	-	-
Triticum dicoccum (glume base)	14	-	-	-	-	-	-	-	-
Triticum dicoccum (grain)	2	5	-	-	-	-	-	-	-
Triticum spec. (glume base)	2	-	-	-	-	2	-	-	-
Triticum spec. (grain)	-	-	-	-	1	-	-	-	1
Triticum/Hordeum (grain)	-	-	-	-	-	-	-	-	-
Vicia faba	-	-	-	-	-	3	-	1	-
Quercus spec.	-	-	-	-	-	-	-	-	XXX
Atriplex patula/prostrata	-	3	-	-	-	-	-	-	-
Avena spec. (awn)	-	-	-	-	-	-	-	-	-
Bromus secalinus-type	-	-	-	-	-	1	-	-	-
Chenopodium album	17	11	-	2	6	-	-	2	-
Chenopodium ficifolium	-	-	-	-	1	-	-	-	-
Chenopodium spec.	-	-	-	-	-	-	-	-	-
Echinochloa crus-galli	-	-	-	-	1	-	-	-	-
Eleocharis palustris	-	-	-	-	-	-	-	-	-
Fallopia convolvulus	1	-	-	-	1	-	-	-	-
Galium aparine	-	-	-	-	-	-	-	-	1
Galium spurium	1	-	-	-	-	1	-	-	1
Galium spurium/aparine	-	-	-	-	-	-	-	-	-
Galium verum	1	-	-	-	-	-	-	-	-
Gramineae	-	-	-	-	-	1	-	-	-
Hieracium spec.	1	-	-	-	-	-	-	-	-
Lapsana communis	-	-	-	-	-	1	-	-	-
Leucanthemum vulgare	-	-	-	-	-	1	-	-	-
Linum catharticum	-	-	-	-	1	-	-	-	-
Matricaria maritima	-	2	-	-	-	-	-	-	-
Myosotis spec.	-	-	-	-	-	1	-	-	-
Odontites spec.	1	-	-	-	-	-	-	-	-
Papaver setigerum	-	-	-	-	-	-	-	-	-
Papilionaceae	-	3	1	-	-	-	-	-	-
Poa annua	-	1cf	-	-	-	-	-	-	-
Poa spec.	4	5	-	-	1	-	-	-	-
Polygonum aviculare	-	-	-	-	1	-	-	-	-
Polygonum spec.	1	-	-	-	-	-	-	-	-
Prunella vulgaris	1cf	-	-	-	-	-	-	-	-
Raphanus raphanistrum	-	-	-	-	-	-	-	1	-
Rumex acetosella	2	-	-	-	2	-	-	-	-
Rumex crispus-type	1	-	-	-	-	-	-	-	-
Rumex spec.	-	-	-	-	-	-	-	-	-
Scleranthus annuus	-	1	-	-	-	-	-	-	-
Silene spec.	-	-	-	-	-	-	-	-	-
Trifolium-type	4	-	-	-	1	1	-	-	-
Umbelliferae	-	1	-	-	-	-	-	-	-
Veronica hederifolia	-	-	-	-	1	-	-	-	-
Vicia hirsuta/tetrasperma	-	-	-	-	1	-	-	-	-
Vicia lathyroides	1cf	-	-	-	-	-	-	-	-
Vicia spec.	3	-	-	1	9	-	-	-	-
Vicia tetrasperma	-	-	-	-	-	4	-	-	-
Vicia/Lathyrus	-	-	-	-	1	-	-	-	-

5.20.3 SAMPLES

From the sites 13, 15 and 17, 28 samples were selected for botanical analysis. From site 13, nine samples were investigated: the fillings of the Bronze final IIIa pits, silos and groups of isolated postholes described above. From site 15, 18 samples were investigated: silos, a vase-silo, a so-called Polynesian oven (all dating from the Hallstatt D1/D2 period) and postholes of three out of the four granaries (all dating from the Hallstatt D2/D3 period). From site 17, a single sample was investigated: the filling of silo 1358, which had been noted in the field to contain large amounts of charred acorns. The date of this pit remains uncertain (Bronze Age or Iron Age). All botanical analyses were carried out by the author. The volume of the samples is given in table 5.19.

5.20.4 MACRO REMAINS

The samples from the Bronze final IIIa features contained remains of grains of (hulled) barley, emmer wheat, millet and lentil. The Hallstatt D1/D2 structures produced small numbers of remains: millet was found in 1321, hulled barley, lentil and horse bean in 1322. Six samples from the Hallstatt D2/D3 granary postholes did not yield any seeds. The other granary samples yielded grains of barley, millet, lentil, gold-of-pleasure and flax. The sample from structure 1358 consisted of charred acorns. From the total assemblage 42 different weed taxa (seeds identified up to family, genus or species-level) were found.