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Plant Use by the Funnel Beaker Farmers in Poland. New Archaeobotanical Data From Pottery Sherds and Daub Imprints

Użytkowanie roślin przez rolników kultury pucharów lejkowatych w Polsce Nowe archeobotaniczne dane pozyskane z odcisków w ceramice i polepie

Abstract: The article presents the results of archaeobotanical studies on plant macroremains preserved both in charred form and as imprints in pottery and daub. The materials were collected from Funnel Beaker culture sites in Kałdus, Sławęcinek, Kietrz, and Małe Czyste. In total, 218 daub fragments and 33 pottery sherds were analysed. Most of the assemblages contained at least one of the searched items, such as imprints and/or charred macroremains. Hulled wheat (*Triticum monococcum/dicoccon/spelta*) chaff, including glumes, glume bases, spikelet forks, and culms and blades of indeterminate cereals and/or wild grasses (*Cerealia*/Poaceae indet.), were among the most commonly found imprints. Interestingly, some assemblages contained crushed bones and microscopic charred wood fragments, illustrating a husbandry strategy that utilised all accessible resources.

Keywords: archaeobotany, imprints, pottery, daub, Neolithic, FBC, agriculture

Introduction

In 2020, Marek Nowak and a team of researchers published a summary of studies regarding plant use by the Funnel Beaker culture (FBC) societies in Poland known at the time (Nowak et al. 2020). The material included archaeobotanical data from 57 sites, most of which are located in western Lesser Poland, Kuyavia, and Lower Silesia (Nowak et al. 2020: Fig. 1). The identification of cultivars and wild plants was based on the analysis of plant macroremains preserved both in charred form and as impressions in pottery sherds and daub.

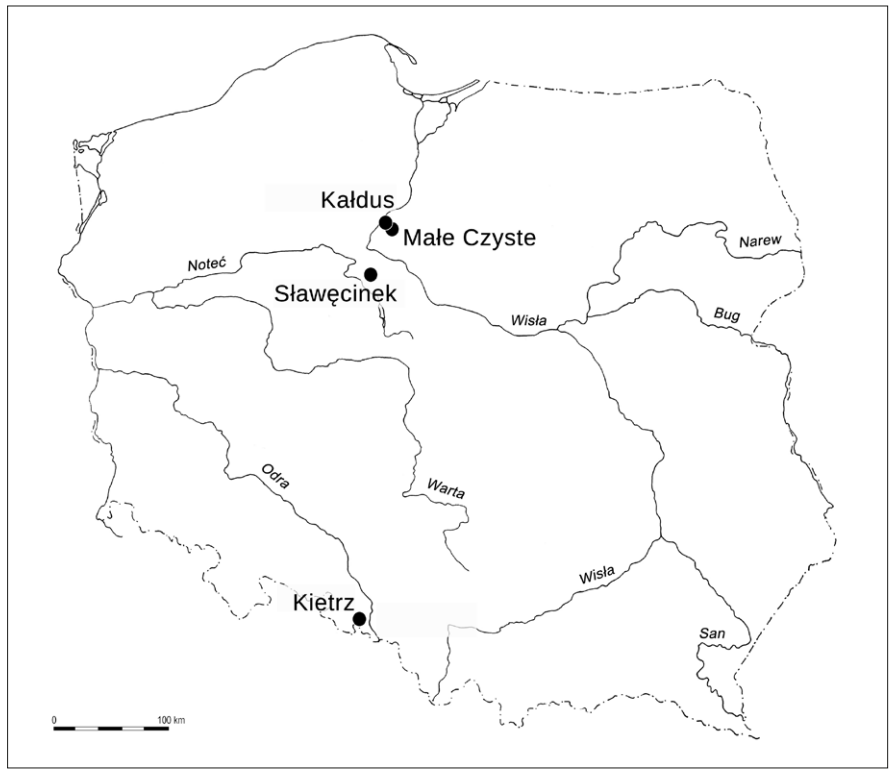

Fig. 1. Map of Poland with FBC sites mentioned in the article.

In subsequent years, new data on archaeobotany of FBC sites have been published. These include two sites from Chełmno Land: Małe Czyste in the Chełmno District (Kofel 2020) and Browina in the Toruń District (Bienias, Kofel 2021). Additionally, assemblages from Kuyavia were studied, where an unchambered tomb was discovered at site 1 in Gaj Stolarski in the Włocławek District (Mueller-Bieniek 2023). Therefore, a slow but steady growth in archaeobotanical information on plant use by FBC farmers is noticeable. The article presents new archaeobotanical data that expand the database of information on plants and other tempering resources used during the FBC in Poland. Such studies contribute to the understanding of plant use and agricultural activities in FBC settlements.

The article includes unpublished data from several sites, with one of the most significant being four sites (sites 1–4) in Kałdus, Chełmno District. Other results were derived from site 13 in Sławęcinek, Inowrocław District, and from Kietrz in the Głubczyce District in Upper Silesia. Furthermore, we cite results from site 20 in Małe Czyste (Kofel 2021) concerning FBC graves, albeit published in a less accessible monograph.

As mentioned, all studied assemblages are dated to the FBC, widely regarded as the first farming cultural unit. FBC communities developed through complex cultural processes north of the Alps and the Carpathians (e.g. Wiślański 1979; Kukawka 1997; Nowak 2009). Despite their local Central European origin, FBC people practised a mixed type of agriculture. This agricultural system represents a continuation and transformation of food acquisition strategies originating in Anatolia, known by Neolithic farmers from the Balkans and Carpathian Basin (see Nowak 2009: 33–66).

FBC agriculture was complex, centred on animal husbandry with pasturing, and supplemented by hunting and fishing to a lesser extent (Kulczycka-Leciejewiczowa 1993: 174). Cultivation included einkorn and emmer wheat, barley (Klichowska 1975; 1979; Mueller-Bieniek 2016; Nowak et al. 2020: 99), likely peas (*Pisum sativum*) (Bieniek 2007: 330; Mueller-Bieniek 2016), lentils (*Lens culinaris*) (Lityńska-Zając 2013: 297), flax (*Linum usitatissimum*), and opium poppy (*Papaver somniferum*) (Nowak et al. 2020: 97). Archaeobotanical assemblages are often associated with wild taxa (e.g. Bieniek 2007; Mueller-Bieniek 2016), collected either accidentally or deliberately.

Archaeological contexts of the plant macroremains assemblages

Samples of potsherds and daub were collected from three different regions in Poland: Chełmno Land, Kuyavia, and Upper Silesia (Fig. 1). During the Neolithic period, these areas served as separate centres of early agrarian communities (see: Bukowska-Gedigowa 1975; Kośko 1981; Kukawka 1997).

Kałdus is a large site spanning 15 acres. The first research there was undertaken in the late nineteenth century, with systematic excavations ongoing since 1996 (Chudziak 2003). The site held political and cultic significance during the early Middle Ages, at the transition from the Bronze Age to the Iron Age, as well as during the Neolithic period of the Funnel Beaker Culture. Over the years of studies, numerous FBC features have been uncovered. Some pits had cultic significance containing artefacts (made of metal or flint) from distant locations. Furthermore, a small-scale cremation cemetery dating from 3650–3100 BC was also explored (see: Kowalski et al. 2020; Adamczak et al. 2021).

Another FBC site in Chełmno Land is Małe Czyste with five kerb-graves (quasi-megalithic structures) (Adamczak et al. 2020) studied in the 1980s and 2010 (see Bokiniec 2020). Excavations revealed cemeteries from various periods, including the Neolithic (FBC), the beginning of the Iron Age (Lusatian and Pomeranian cultures), the Pre-Roman and Roman periods (Oksywie and Wielbark culture), and the early Middle Ages. From the fills of two Neolithic graves (no. 1 and 2), pieces of daub, which formed a sort of roofing above small graves, were collected.

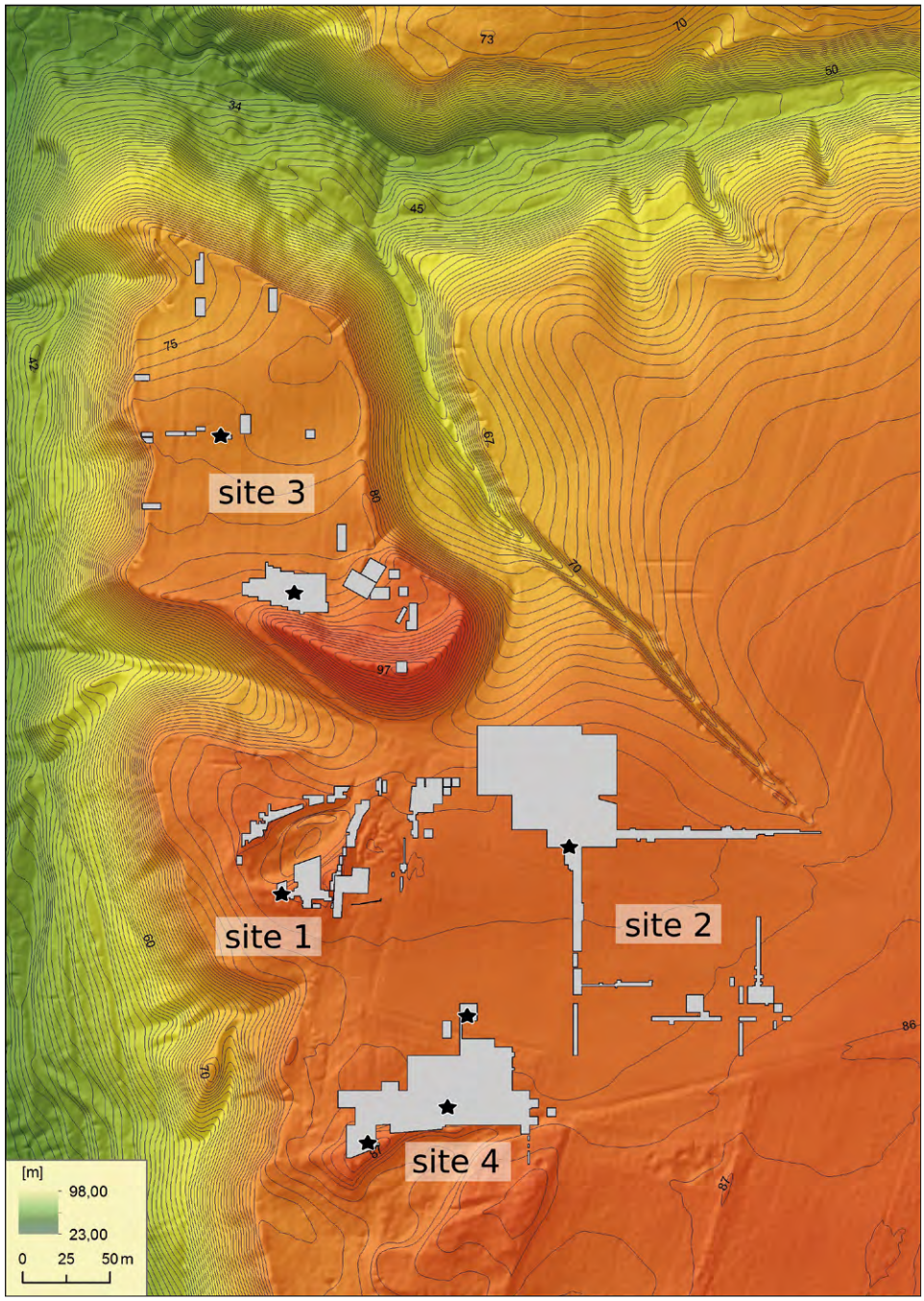

Fig. 2. Map of sites 1–4 in Kałdus (by: Mateusz Skrzatek).

The cemetery of quasi-megalithic graves in Małe Czyste was in use between 3500 and 3350 BC and is associated with the Wiórek phase of the Eastern FBC (Kukawka, Wyrzykowska 1990; Adamczak et al. 2020: Table 3).

In Kuyavia, one site was studied (Fig. 1). Rescue excavations were undertaken at site 13 in Sławęcinek in 2016, uncovering an FBC settlement dated to 3500–3100 BC (the Wiórek phase of the Eastern FBC). The settlement contained three to four households, which included houses constructed of posts, settlement pits, sacrificial pits, and inhumation graves (Adamczak et al. 2021: 4).

The last analysed materials were collected in 1980 at site Kietrz in Upper Silesia (Łęczycki 1982). Pottery sherds and daubs were found among the relics of an FBC house with a basement. During excavations, it was discovered that the house had burned down. Within the household, a hoard of copper axes, pottery, and daub were unearthed (see: Łęczycki 1982). The household was radiocarbon dated to 3500–3350 BC (Kowalski et al. 2024) and is linked to a younger phase of the Upper Silesian-Moravian group of FBC (Bukowska-Gedigowa 1975).

Materials and methods

Assemblages were derived from archaeological excavations conducted over various research seasons. The presented plant macroremains were extracted from pottery sherds and daub fragments, with specimens preserved both in charred form and as imprints. Details of the processed materials, complete species lists, and the abundance of plant remains recovered from each sample are listed in Table 1.

Pottery sherds and daub fragments were weighed, measured, and cleaned using a soft brush and hand dust pump. Each surface was then examined for imprints and/or charred plant fragments. Subsequently, the fragments were crashed to check for imprints and preserved macroremains inside the pieces. Small fragments (<20 mm) and most pottery sherds were not crashed. The fragments were inspected under low magnification (10x) using a microscope. The abundance of organic remains was estimated on the following scale: 'x' – occasional (up to 10 items), 'xx' – medium (11 to 50 items), 'xxx' – abundant (51 to 250 items), 'xxxx' – highly abundant (over 250 items). All plant macroremains were identified using botanical literature (e.g. Kulpa 1974; Cappers et al. 2006; Jacomet 2006). Nomenclature follows Mirek et al. (2002).

Results

A total of 218 daub fragments and 33 pottery sherds were analysed. Most of the assemblages contained at least one of the searched items i.e. imprints and/or charred macroremains. The results were divided based on the site where they were found and the type of find (pottery sherd or daub fragment).

Tab. 1. Plant macroremains identified in pottery sherds and daub fragments collected from FBC sites in Poland. * – found in the sample bag containing daub pieces; ** – detailed information published in Kofel (2020); (gr) – grain; (sf) – spikelet fork; (gb) – glume base; (gl) – glume; (ra) – rachis; P – pottery sherds; D – daub.

Town/ Village	Kałdus									Sławęcinek	Kietrz		Małe Czyste
site	site 1	site 2	site 3	site 3	site 4					site 13	site 25		site 20
TYPE OF MATERIAL	D	P	D	D	D	P	P	D	P	D	P	D	D
SEASON	1999	2009	1996	2002	2001		2002	2015		2016	1980		1986
FEATURE	286	1181	1	9	254		792	10		713	113		graves**
CHARRED													
CEREALS													
Hordeum vulgare (gr)									x				
Triticum monococcum (sf)													x
Triticum dicoccon (gb)				x			x						
Triticum dicoccon (sf)	x			x								x	x
T. monococcum/dicoccon/spelta (gb)	x		x	x									x
T. monococcum/dicoccon/spelta (sf)			x							x			
Cerealia/Poaceae indet. (gr)													
Cerealia/Poaceae indet. (gl)				x								x	
Cerealia/Poaceae indet. (gb)													x
Cerealia/Poaceae indet. (ra)				x			x						
OTHER													
Corylus avellana (frag.)	x*												
Bromus sp.	x			cf.x									
Cirsium sp.									x				
Veronica sp.													x
cf. *Sambucus* sp.												x	
Chenopodiaceae indet.							x						
Poaceae indet.			x										
epidermis (frag.)									x				
bud indet. (frag.)													x
indeterminate													

Town/ Village	Kałdus									Sławęcinek		Kietrz	Małe Czyste
CHARCOAL													
<4mm		x			x	x	x						x
IMPRINTS													
CEREALS													
Avena sp. (gr)									x	x		x	
Hordeum vulgare (gr)	x		x						x			x	x
Panicum miliaceum (gr)									x			x	
Triticum monococcum (gr)												x; cf x	x
Triticum monococcum (sf)	x		x									x	x
Triticum monococcum (gb)	x												x
Triticum dicoccon (gr)			x									x	
Triticum dicoccon (sf)	x									x			x
Triticum dicoccon (gb)													x
Triticum sp. (gr)			x						x				
T. monococcum/dicoccon/spelta (sf)	x		xx	x			x	x	x			xx	xx
T. monococcum/dicoccon/spelta (gb)	xx		xx	x			x						x
Cerealia/Poaceae indet.													
*grain			x	x				x	x	x	x	x	x
*spikelet fork			x										
*glume	xx		x	x								xx	x
*rachis								x				x	
*spikelet													x
*ear/panicle											x		
*culm and/or leaves	xx		xxx	xx			x	x	xx	xx		xx	x
OTHER													
Bromus sp.	x												
Veronica sp.													x
cf. *Lithospermum* sp.													x
bones (frag.)							x					x	x
wood imprints										x		x	x
DESICCATED													
epidermis			x		xx					x			x
T. monococcum/dicoccon/spelta (sf)					x					x			x

1. Kałdus, Site 1

Four daub pieces were analysed from multi-layered feature no. 286, excavated during the 1999 season. This feature, of an undefined function, contained 127 pottery sherds, 58 animal bone fragments, and eight daub pieces. The materials included imprints of einkorn wheat (*Triticum monococcum*) and hulled wheat (*T. monococcum/dicoccon/spelta*) glume bases and spikelet forks, emmer wheat (*T. dicoccon*) spikelet forks, and chaff of indeterminate cereals and/or wild grass (*Cerealia*/Poaceae indet.). Additionally, impressions of barley (*Hordeum vulgare*) and brome grasses (*Bromus* sp.) grains were noted.

The charred assemblage included hulled wheat (*T. monococcum/dicoccon/spelta*) glume bases, emmer wheat (*T. dicoccon*) spikelet forks, and brome grasses (*Bromus* sp.) grains. Apart from daub fragments, the bag sample contained daub dust and sand, which, when examined under a microscope, revealed pieces of common hazel (*Corylus avellana*) nutshell. However, this finding should be treated with caution.

2. Kałdus, Site 2

From settlement pit no. 1181, explored during the 2009 season, one daub fragment and one pottery sherd were studied. This pit of unrecognised function contained an accumulation of artefacts, including 72 pottery sherds and 12 animal bone pieces at the base of the multi-layered feature. In archaeobotanical analyses, only the pottery sherd contained occasional small charred wood fragments.

3. Kałdus, Site 3

In the 1996 season, 30 daub fragments were analysed from cultural layer no. 1. Daub was found among other artefacts, including pottery sherds, suggesting a demolished feature. The daub pieces comprised imprints of indeterminate chaff and construction elements. Other impressions included grains of emmer wheat (*T. dicoccon*), barley (*Hordeum vulgare*), undetermined wheat (*Triticum* sp.), and undetermined cereals and/or wild grass (*Cerealia*/Poaceae indet.). Additionally, there were einkorn wheat (*T. monococcum*) spikelet forks, hulled wheat (*T. monococcum/dicoccon/spelta*) glume bases and spikelet fork, and chaff of undetermined cereals and/or wild grasses (*Cerealia*/Poaceae indet.). Dried epidermis, charred hulled wheat (*T. monococcum/dicoccon/spelta*) spikelet forks and glume bases, and wild grass (Poaceae indet.) grains were also identified in the assemblage.

In the 2002 season, five daub fragments were analysed from feature no. 9, which was interpreted as a settlement pit of unrecognised function. The assemblage included imprints of chaff, hulled wheat (*T. monococcum/dicoccon/spelta*)

glume bases and spikelet forks, and grains of undetermined cereals and/or wild grass (*Cerealia*/Poaceae indet.). The charred plant macroremains comprised an emmer wheat (*T. dicoccon*) spikelet fork, hulled wheat (*T. monococcum/dicoccon/spelta*) glume bases, a grain likely from brome grass (cf. *Bromus* sp.), chaff from indeterminate cereals and/or wild grasses (*Cerealia*/Poaceae indet.), and an undetermined cereal (*Cerealia* indet.) rachis.

4. Kałdus, Site 4

One pottery sherd and five pieces of daub from a cultic or settlement pit (no. 254), explored in the 2001 season, were analysed. In this feature, an amphora and a quern were discovered, with daub fragments found at the top. The archaeobotanical analysis of the pottery sherd revealed small charred wood fragments. The daub pieces contained dried chaff of undetermined cereal and/or wild grass (*Cerealia*/Poaceae indet.), hulled wheat (*T. monococcum/dicoccon/spelta*) spikelet forks, and occasional charred wood fragments.

Five pottery sherds collected during the excavation of a cremation grave (feature no. 792) in the 2002 season were also analysed. The feature contained occasional pottery sherds, a pestle and a ceramic vessel filled with burned human remains. The botanical finds comprised charred emmer wheat (*T. dicoccon*) glume base, an undetermined cereal and/or wild grass (*Cerealia*/Poaceae indet.) rachis, an amaranth family (Chenopodiaceae indet.) seed, and occasional fragments of charred wood. Additionally, highly fragmented bones were noted.

Most pottery sherds exhibited occasional imprints of grass blades and/or leaves of indeterminate cereal and/or wild grasses (*Cerealia*/Poaceae indet.). There were also impressions of hulled wheat (*T. monococcum/dicoccon/spelta*) spikelet forks and glume bases.

During the 2015 season, 33 daub fragments and 18 pottery sherds were studied from settlement pit no. 10, which had a homogenous fill. At the base of this feature were two burned stones and fragments of pottery and daub. The daub pieces contained imprints of chaff and hulled wheat (*T. monococcum/dicoccon/spelta*) spikelet forks. Additionally, impressions of grains and rachis of undetermined cereals and/or wild grass (*Cerealia*/Poaceae indet.) were identified.

The pottery sherds contained charred plant remains, including barley (*Hordeum vulgare*) grain, a thistles (*Cirsium* sp.) seed, and the epidermis of undetermined cereals and/or wild grass (*Cerealia*/Poaceae indet.). Imprints included grains of millet (*Panicum miliaceum*), oat (*Avena* sp.), barley (*Hordeum vulgare*), likely wheat (cf. *Triticum* sp.), likely oat (cf. *Avena* sp.), and indeterminate cereals and/or wild grass (*Cerealia*/Poaceae indet.). Additionally, the materials included impressions of hulled wheat (*T. monococcum/dicoccon/spelta*) spikelet forks,

and grass blades and/or leaves of indeterminate cereal and/or wild grasses (*Cerealia*/Poaceae indet.).

5. Sławęcinek, Site 13

Three daub pieces were analysed from a two-layered sacrificial pit (feature no. 713) excavated during the 2016 season. The feature contained fragments of libation vessels, a bone chisel, 272 potsherds, 199 animal bones, a bone point, and daub. The botanical assemblage included charred hulled wheat (*T. monococcum*/*dicoccon*/*spelta*) spikelet forks. Imprints of oat (*Avena* sp.) grains, emmer wheat (*T. dicoccon*), and hulled wheat (*T. monococcum*/*dicoccon*/*spelta*) spikelet forks, along with grains and highly fragmented chaff of undetermined cereals and/or wild grasses (*Cerealia*/Poaceae indet.) were identified. Additionally, the materials included dried epidermis, some identified as hulled wheat (*T. monococcum*/*dicoccon*/*spelta*) spikelet forks.

6. Kietrz, Site 25

Four daub fragments and eight pottery sherds were analysed from the remains of a house with a pit-basement (feature no. 112), excavated during the 1980 season. The subfloor was filled with storage and serving wares, damaged stone mills, textile tools, and other artefacts interpreted as household inventory and waste. Copper axes were discovered in an undecorated ceramic amphora (Łęczycki 1982; Kowalski et al. 2024).

Pottery sherds exhibited occasional imprints of grains, grass blades and/or leaves, and ears/panicles of indeterminate cereal and/or wild grasses (*Cerealia*/Poaceae indet.). Daub pieces contained occasional charred glumes of indeterminate cereal and/or wild grasses (*Cerealia*/Poaceae indet.) and a seed probably of elder (cf. *Sambucus* sp.). The assemblage also included imprints of grains of oat (*Avena* sp.), barley (*Hordeum vulgare*), millet (*Panicum miliaceum*), einkorn wheat (*T. monococcum*), and emmer wheat (*T. dicoccon*). Moderate impressions of hulled wheat (*T. monococcum*/*dicoccon*/*spelta*) and occasional imprints of einkorn wheat (*T. monococcum*) spikelet forks were noted. Additionally, there were impressions of grains, grass blades and/or leaves, glumes, and a rachis of undetermined cereals and/or wild grasses (*Cerealia*/Poaceae indet.), along with imprints of wooden elements and chaff. Moreover, crashed bones were also used as temper.

7. Małe Czyste, Site 20

Materials for analysis were collected from two graves excavated during the 1984–1985 season: grave 1 (feature no. 107) and grave 2 (feature no. 88). In grave 1, no human remains were found, but the fill included 69 FBC pottery sherds, flints,

daub, animal bones, and a fragment of a stone axe. In grave 2, pieces of a human skull were discovered, along with 222 pottery sherds, flints, daub, animal bones, and charred wood fragments (Adamczak et al. 2020: Table 1).

One hundred and thirty-eight daub fragments were analysed, revealing both imprints and charred macroremains (Kofel 2020). The materials included charred spikelet forks of einkorn wheat (*T. monococcum*) and emmer wheat (*T. dicoccon*), as well as glume bases of hulled wheat (*T. monococcum/dicoccon/spelta*) and indeterminate cereals and/or wild grasses (*Cerealia*/Poaceae indet.). Additionally, a charred seed of speedwell (*Veronica* sp.), a fragment of undetermined bud, and microscopic pieces of charred wood were identified.

Imprints of grains of barley (*Hordeum vulgare*), einkorn wheat (*T. monococcum*), and indeterminate cereals and/or wild grasses (*Cerealia*/Poaceae indet.) were present in the assemblage. Impressions of einkorn wheat (*T. monococcum*), emmer wheat (*T. dicoccon*), and hulled wheat (*T. monococcum/dicoccon/spelta*) spikelet forks and glume bases were also noted. Furthermore, occasional impressions of grains, chaff, grass blades and/or leaves of undetermined cereals and/or wild grasses (*Cerealia*/Poaceae indet.), along with imprints of speedwell (*Veronica* sp.), a fruit of probable gromwell (cf. *Lithospermum* sp.), and wooden fragments were recognised. The assemblage comprised fragments of crashed bones and pieces of the desiccated indeterminate epidermis, some identified as spikelet forks of hulled wheat (*T. monococcum/dicoccon/spelta*).

Discussion

Hulled wheat (*T. monococcum/dicoccon/spelta*) chaff, including glumes, glume bases, spikelet forks, and culms and blades of indeterminate cereals and/or wild grasses (*Cerealia*/Poaceae indet.), were prevalent among the imprints found in the analysed materials. Additionally, occasional impressions of cultivar grains such as barley (*Hordeum vulgare*), millet (*Panicum miliaceum*), einkorn wheat (*T. monococcum*), and emmer wheat (*T. dicoccon*) were identified. In addition to cultivated plants, remains of wild plants were also present, including brome grass (*Bromus* sp.), thistles (*Cirsium* sp.), and probable elder (cf. *Sambucus* sp.). This selection of temper aligns with the common practice of using leftover materials from crop processing rather than editable parts of plants (e.g. Kofel 2020).

Interestingly, both charred and desiccated plant remains were discovered. In some instances, domestic ash and fresh (maybe already dried) parts of plants were mixed with clay pastes. However, this hypothesis requires further investigation, including experimental studies.

The presence of fragmented bones is also noteworthy. While the use of bones as temper is well-established in FBC pottery studies (Wojciechowski 1973;

Rauba-Bukowska 2009; Kowalski et al. 2020), in case of daub, at the time of writing, bone temper has been observed only in materials from sites in Kietrz and Małe Czyste. This discrepancy might stem from mundane factors such as the methods used for daub analysis (e.g. fragment crashing), or it could indicate other aspects related to clay processing. Therefore, additional research is necessary.

Interpretating archaeobotanical studies of daub and pottery sherds can be complex. On the one hand we often analysed fragments from sealed and well-defined contexts, but on the other hand it is crucial to recognise that the plant remains found within the ceramic mass may not necessarily reflect the fill of the sampled feature (Mueller-Bieniek 2016: 753; Bienias, Kofel 2021). The selection of temper appears to have been influenced by social context (Kowalski et al. 2020), accessibility, and sometimes the technology used in pottery and daub-making. Therefore, direct comparisons between results from soil samples and daub imprints may not be straightforward. However, we can still estimate which taxa were present at the researched site and infer which species were processed and consumed. Furthermore, charred plant macroremains extracted from daub and pottery can provide valuable insights into agriculture practices and serve as material for radiocarbon dating, e.g. in Kietrz (Kowalski et al. 2024).

To summarise, the archaeobotanical findings from the sites discussed align closely with other FBC studies, where impressions of various species of wheat, barley, and occasional wild plants are commonly identified (Lityńska-Zając 2002; Mueller-Bieniek 2016; Nowak et al. 2020; Mueller-Bieniek 2023). The materials presented in this article do not exhibit significant chronological differences from previously analysed plant assemblages from FBC sites (Nowak et al. 2020). All the sites are dated to the second half of the 4th millennium BC.

Conclusions

The assemblages gathered from sites in Kałdus, Sławęcinek, Kietrz, and Małe Czyste contain plant macroremains preserved in both charred form and as impressions in daub and pottery sherds. The discovery of hulled wheat chaff, occasional cultivar grains, seeds of wild plants, fruit, crushed bones, and microscopic charred wood fragments indicates that FBC farmers was adept at utilising a wide range of available plant resources.

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Streszczenie

W artykule zawarto wyniki analiz archeobotanicznych makroskopowych szczątków roślin zachowanych zarówno w formie spalonej, jak i jako odciski w ceramice i polepie. Celem badań jest dalsze rozbudowywanie bazy danych do zagadnienia gospodarki roślinami w dobie KPL. Artykuł zawiera dane z ziemi chełmińskiej, zwłaszcza istotne są niepublikowane wyniki odnoszące się kompleksu stanowisk w Kałdus (stan. 1–4). Ponadto przywołujemy wyniki badań z Małe Czyste, które ukazały się w trudno dostępnej monografii i dotyczą grobów ludności KPL. Artykuł zawiera również niepublikowane wyniki badań z rejonu Kujaw ze stanowiska 13 w Sławęcinku oraz z regionu Górnego Śląska dla stanowiska w Kietrz. W sumie przebadano 218 fragmentów polepy oraz 33 kawałki ceramiki, z których prawie każdy podsiadał przynajmniej jeden z rodzajów materiałów, tj. odciski bądź spalone szczątki roślin. Najczęściej zaobserwowanymi oznaczeniami były odciski fragmentów plew oplewionych pszenic (*Triticum monococcum/dicoccon/spelta*), a także rozdrobnionych fragmentów źdźbeł i/lub liści nieokreślonych gatunków zbóż lub traw dzikich (*Cerealia*/Poaceae indet.), tzw. sieczki. Dodatkowo zaobserwowano pokruszone fragmenty kości oraz mikroskopowe fragmenty spalonych kawałków drewna, które pozwalają przypuszczać, że społeczności kultury pucharów lejkowatych używały różnych dostępnych materiałów do schudzania masy ceramicznej.

Słowa kluczowe: archeobotanika, odciski, ceramika, polepa, neolit, KPL, gospodarka rolnicza

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