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CULTURES OF MORTUARY PRACTICES INFERRED FROM ARCHAEOBOTANICAL AND ARCHAEOLOGICAL RESULTS FROM THE 17TH-18TH CENTURY PROTESTANT BURIALS OF THE VON GLASENAPP FAMILY IN BIAŁOWĄS (BALFANZ), WESTERN POMERANIA

ABSTRACT

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The primary objective of this paper is to compile the results of archaeobotanical analyses (seeds/fruits, pollen, wood) of samples taken from 10 coffin burials dating to the 17th-18th centuries, belonging to the Protestant family von Glasenapp at Białowąs (Balfanz). This study provides new insights into local funerary customs and the role of botanical elements in funerals. The plant remains preserved in the coffins indicate considerable restraint in the quantity and type of plants used. The coffins were primarily filled with hop cones, hay, and wood shavings. When considering the history of the von Glasenapp family and the results of the archaeological and archaeobotanical research, it is possible to reconstruct Christian Protestant funerary traditions as practised at the household level.

Keywords: archaeobotany, funerary archaeology, funerary plants, Protestants, Poland
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INTRODUCTION

Among the various aspects of archaeological research that facilitate a deeper understanding of past customs and beliefs, funerary practices hold a special place (Grupa 2005; 2023). The analysis and interpretation of grave goods, human remains, and burial equipment gave rise to a separate branch of archaeology known as funerary archaeology (Czopek 2012, 11).

Incorporating archaeobotanical analysis into the study of burials has enabled an interdisciplinary look of the history of funerary ceremonies and the role of plants within them. Specific plants are used for various purposes. For example, some species had antiseptic properties that slowed the rate of decomposition in the body. The strong aroma of the plants often masked the unpleasant odour of decomposing remains and deterred necrophagous insects and animals. The plants' aesthetic qualities were also important (Lagerås 2016, 12; Kurasiński *et al.* 2018, 174; Pińska and Drążkowska 2020a, 103). However, the importance of plants in funeral rituals went beyond practical aspects. Plants were associated with religious and metaphysical symbolism, often based on their medicinal properties. The choice of plant species was influenced by beliefs and traditions, as well as by the time of death or the seasonal availability of plants in a particular place. Some plants were considered magical, with the ability to help the deceased soul on its journey to the afterlife. Others symbolised fertility and abundance in the afterlife. The botanical composition of a burial was also influenced by the deceased's religion, their social status, and their familial wealth (Badura *et al.* 2023).

Most often, plants were placed in burials within bouquets or wreaths. Live and artificial plants made of silk, paper, or glass were used in their construction and were often mounted on wooden and metal structures (*e.g.*, Drążkowska 2006; Neumann 2007; Lippok 2009, 2015; Grupa 2015; Grupa *et al.* 2014; Majorek and Grupa 2014; Grupa and Nowak 2017; Pińska and Drążkowska 2020b; Leinweber and Fettback 2021, 2024). Plants were also used as filling for pillows and mattresses (Jarosińska *et al.* 2019; Badura *et al.* 2023; Pińska and Drążkowska 2020b; Gałka *et al.* 2022). During archaeological excavations, these elements are preserved as visible seeds, fruits, or fragile flowers and vegetative parts. Interdisciplinary research, including the analysis of pollen, spores, wood, and moss, enables the identification of plants. In this way, burials from different periods and cultures can be studied in detail, and the significance of plants in funeral rituals can be clarified.

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The crypt of the von Glasenapp family in Białowąs (Balfanz) is one of the sites that contain traces of this important West Pomeranian noble family from the 17th to the 19th centuries. Archaeological investigation made it possible to halt the destruction of the crypt and to put all the coffins in order. In addition to cleaning the crypt, the work focused on documenting the coffin furnishings and conducting a bioanthropological investigation of the human remains present. These activities led to the discovery of botanical remains in several coffins. This article presents the botanical composition of materials from individual von Glasenapp burials and discusses the results in the context of the practical and symbolic aspects of plant use in modern burial customs.

THE ARCHAEOLOGY OF THE VON GLASENAPP FAMILY CRYPT

Białowąs (Balfanz) is a small village located a few kilometres north-west of Barwice (Fig. 1). Historical sources mention to it as one of the oldest fiefs of the von Glasenapp family. The family settled in the area around 1400. For many years, family members served as judges in Białogard or local leaders in Szczecinek. The church of Blessed Teresa Ledóchowska in Białowąs (Balfanz) was built at the end of the 17th century by Otto Casimir von Glasenapp as a family burial chapel (Glasenapp 1884; 1897). The crypt where the family members were buried is one of the largest in West Pomerania. The oldest burial in the crypt is likely to date back to 1665 and, according to current research, is believed to belong to Caspar Otto von Glasenapp. The last burial took place in the first half of the 19th century. Over the years, the crypt and the coffins and sarcophagi in it began to deteriorate. The

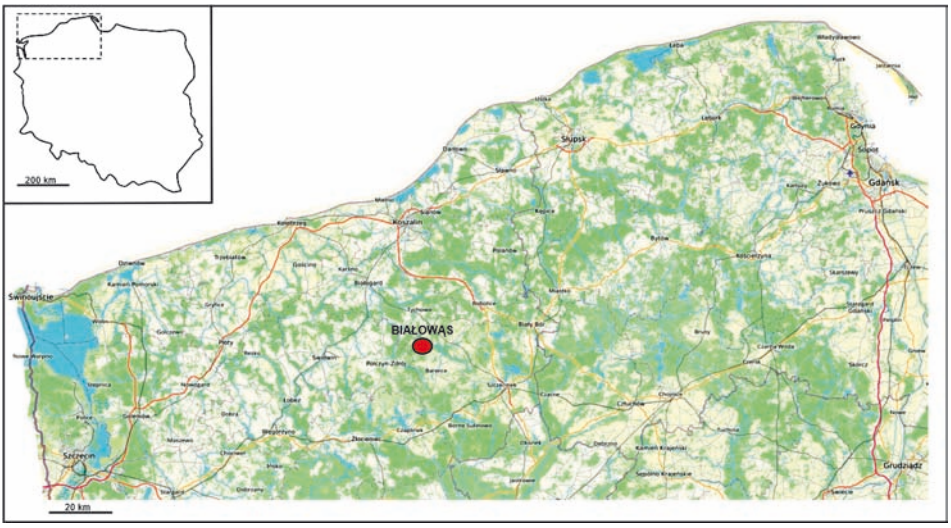

Fig. 1. Białowąs – location of the site (www.geoportal.pl, changed)

Fig. 2. Białowąs – the interior of the crypt before and after the archaeological work
Photo: M. Szeremeta and M. Majewski

first conservation work was carried out in the 1930s. After or even at the end of the Second World War, the crypt was looted. During this time, the church was unused and was located on the territory of the Białowąs State Agricultural Farm. The crypt remained open. It was systematically destroyed, looted, and the mummified bodies desecrated. In 2020, the West Pomeranian Provincial Conservator of Monuments in Szczecin commissioned the Stargard Museum of Archaeology and History to conduct an inventory of the crypt (Majewski *et al.* 2020).

Before the archaeological work, the crypt was in disarray. There was extensive damage (Fig. 2). Some of the sarcophagi's lids had been torn off, and the walls had collapsed. Many decorations and plaques had been torn from the coffins and dismantled. Human remains were found inside the coffins, but also scattered on the brick floor of the crypt (Majewski *et al.* 2020). The remains of burial garments (male and female) and additional grave equipment, including artificial flowers made of silk ribbons attached with brass pins, were found inside and outside the coffins.

The basic premise of the work was to reconstruct the sarcophagi's surroundings from photographs taken in 1934. The area of the crypt was 75.78 m^2 and was laid out on an east-west axis. The room's maximum height was 2.75 metres. The work resulted in the arrangement of the crypt, which is one of the largest modern tombs of the 17th and 18th centuries in West Pomerania. Inside, parts of 32 sarcophagi and coffins were preserved. The oldest is a wooden, trapezoidal, quadrangular sarcophagus (Coffin 22), painted black and originally resting on 10 pewter supports in the shape of lying lions with circular handles in their mouths. This sarcophagus was probably made for Caspar Otto von Glasenapp (before 1613-1665). We can assume that the sarcophagus was brought here by the founder of the church from the chapel that existed in Białowąs before 1648. Otto Casimir von Glasenapp (1642-1710) was buried in a sarcophagus with a coffin placed in the middle of the eastern row (Coffin 17) (Majewski 2021; 2022).

ARCHAEOBOTANICAL ANALYSIS

Due to the destruction of the coffins, the plant material was largely mixed and scattered across the bottom of the coffins, probably the result of looting in search of jewellery or other valuable items. This made it almost impossible to determine the plants' original location. In some cases, plant concentrations were found near specific parts of the body (*e.g.*, the head or feet). In the end, 17 archaeobotanical samples representing 10 burials were collected (Table 1, Fig. 3). They contained both organic (reproductive and vegetative plant parts, wood chips, insect remains, and animal faeces) and inorganic (sand, metal fragments) material (Fig. 4).

In the laboratory, the sediment for palynological analysis was first collected from each sample (at least 1 cm^3). The contents of the samples were then described and weighed. To

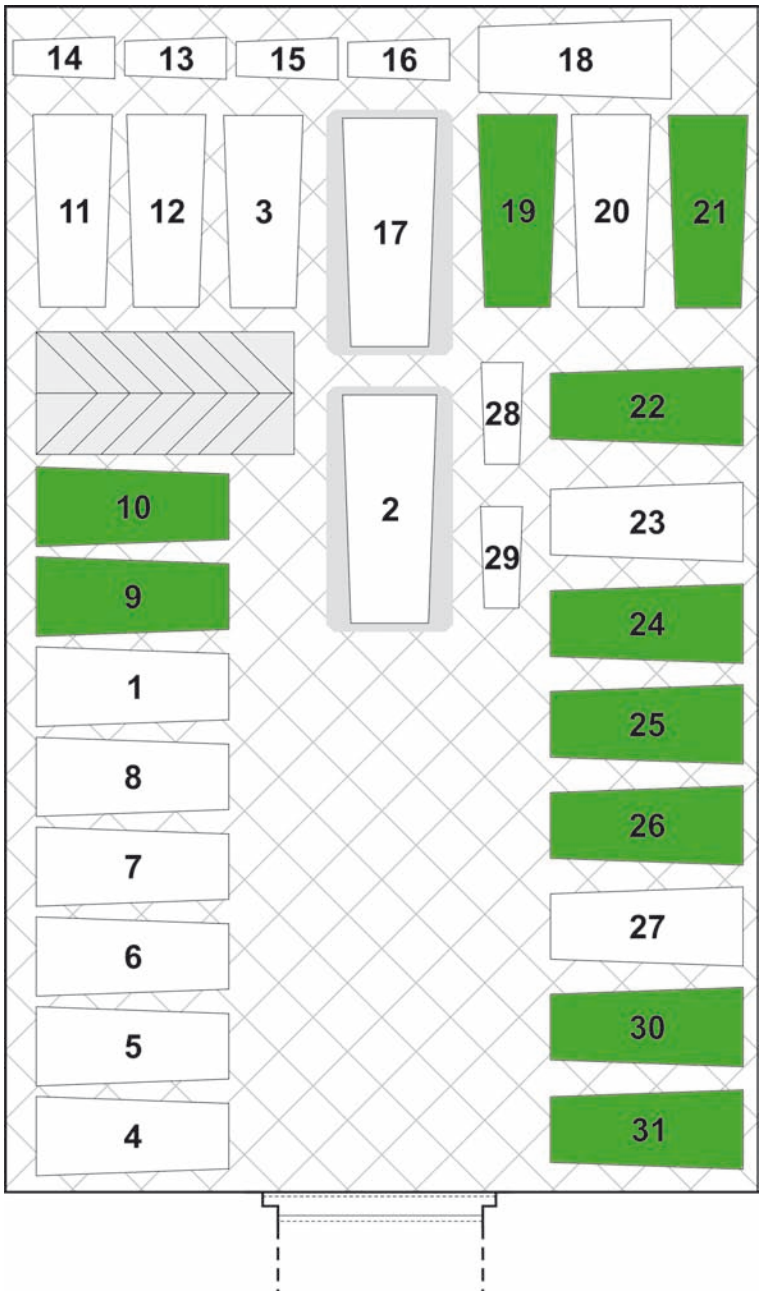

Fig. 3. Białowąs – plan of the crypt with the arrangement of the coffins. Coffins from which material for archaeobotanical analysis was collected are marked in green. Plan of the crypt based on architectural measurements by A. Stefanowicz and J. Chrzanowicz, Z. Wysocki (1964), prepared by M. Szeremeta, Archaeological and Historical Museum in Stargard

separate plant remains from other components, the samples were dry sieved in sieves with different mesh sizes (2.8 mm and 0.5 mm). Seeds, fruits, flowers, leaves, wood chips, and bryophyte fragments were isolated from the fractions identified using a LEICA EZ4 stereo microscope and placed in plastic containers. In the next stage, the seeds, fruits, leaves, and flowers were identified using a Zeiss Stemi SV11 stereo binocular microscope. The Carpological Reference Collection (CRefColl-UGDA) from the Laboratory of Palaeoecology and Archaeobotany, Department of Plant Ecology, University of Gdansk and dry specimens from the Herbarium Universitatis Gedanensis UGDA were used to confirm the identifications.

Table 1. Białowąs – characteristics of archaeobotanical samples, including the type of archaeobotanical analysis

Sample	Location inside the Coffin	Weight [g]	Archaeobotanical analysis			
			Diaspores/ flowers	Mosses	Wood	Pollen
Coffin 9						
9/1	upper part	8	+	+	-	+
9/2	lower part	3	+	-	+	+
Coffin 10						
10	bottom	11	+	-	+	+
Coffin 19						
19/1	upper part	11	+	-	-	+
19/2	lower part	15	+	-	-	+
Coffin 21						
21	bottom	5	+	-	-	+
Coffin 22						
22/1	near the pelvis	11	+	-	-	+
22/2	near the head	7	+	-	-	+
Coffin 24						
24	bottom	14	+	+	+	+
Coffin 25						
25/1	near the head	33	+	-	-	+
25/2	upper part	104	+	+	-	+
25/3	lower part	15	+	-	-	+
25/4	beneath the skull	10	+	-	-	+
Coffin 26						
26/1	near the feet	16	+	+	-	+
26/2	near the head	17	+	+	-	+
Coffin 30						
30	bottom	28	+	+	+	+
Coffin 31						
31	bottom	19	+	-	+	+

Taxonomic names were taken from Mirek *et al.* (2020). The moss gametophores were described according to Szafran (1961) and Smith (2004). Species names are listed according to the classification by Ochyra *et al.* (2003). The identified remains were counted for each sample, and the results are presented in Table 2. A descriptive scale was used for a very large number of finds. The grouping of potential sources from which the plants could have been collected was applied (Badura *et al.* 2023, 90). The naked, uncharred oat caryopsis (*Avena* sp.) was classified as a cultivated form (Table 2). When distinguishing between the cultivated form (*A. sativa*) and the weed (*A. fatua*), the diagnostic feature taken into account is the appearance of the scar on the lower glume. This feature cannot be determined in the absence of glumes (Wieserowa 1967; Jacomet 2006). In samples from Białowąs, a glume from the cultivated form was found, and, probably, the remaining grains are also associated with it.

Wood chips were found in five samples (Table 1). For xylological analysis, 10 pieces of wood shavings of different thicknesses were collected from each sample: the thinnest were less than 1 mm thick, and the thickest were up to 4 mm thick. The difference in chip thickness indicates the stages of board smoothing used for the coffin structure. The analysis of the wood chips was difficult not only due to the small size of the wood fragments but also because of

Fig. 4. Białowąs – archaeobotanical samples before segregation (numbering of samples according to Table 1). Photo: J. Stankiewicz

their state of preservation. The most difficult chips to analyse were the thinnest ones, which wereproduced during the final stages of smoothing the planks. The arrangement of the grain in the boards meant that the cross-section was the thinnest side of the chip, and the longitudinal sections were not evenly aligned with the cut slice. The largest chip surface area was a radial cross-section, which facilitated identification in the case of softwood (Fig. 5). Wood tissue was analysed using a Zeiss Scope.A1 transmitted-light microscope fitted with a Zeiss AxioCam ICc 3 camera and AxioCam software. Publications by Schweingruber (2011), Greguss (1959), Grosser (1977), and the digital version of the catalogue available at www.woodanatomy.ch (Schoch *et al.* 2004) were used for material identification.

Standard laboratory procedures were used to process the palynological samples. First, the organic material was treated with 10% HCl to remove carbonates. Next, the residue was boiled with 10% KOH and macerated using the standard Erdtman acetolysis method for palynology (Berglund and Ralska-Jasiewiczowa 1986). Samples were examined under an Axioskop 2 microscope at 400-630× magnification and photographed with an AxioCam ICc 3 camera from Zeiss and Jenoptik. Identification was based on atlases and keys (*e.g.*, Punt *et al.* 2003; Beug 2004) and on the comparative collection. The palynological material obtained after acetolysis was stored in the Department of Environmental Archaeology and Human Palaeoecology at the Institute of Archaeology, Nicolaus Copernicus University, in Toruń. Palynological results were presented as a percentage diagram showing the selected taxa (Fig. 6).

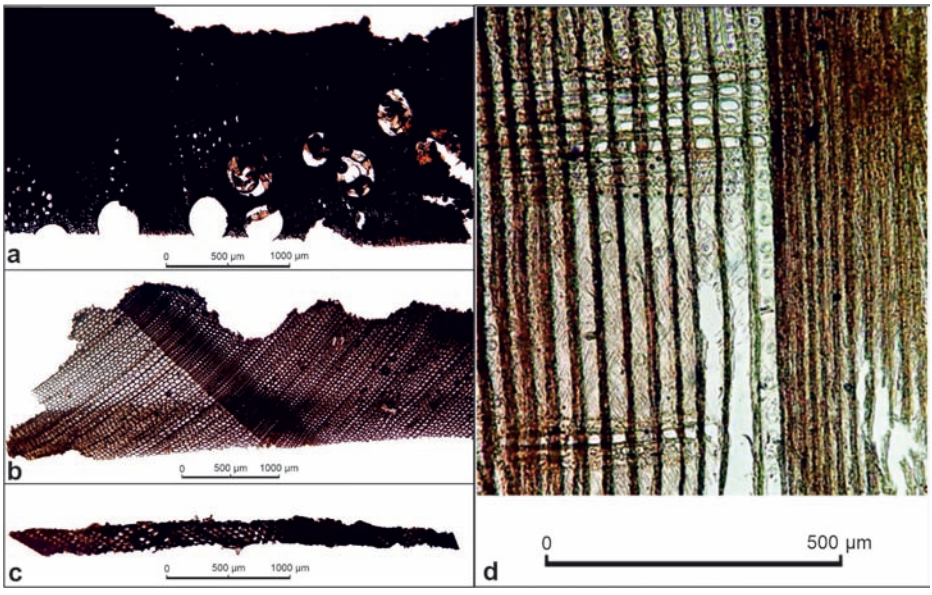

Fig. 5. Białowąs – xylological analysis of wood chips: a-c – cross-sections of chips of different thicknesses (a – *Quercus* sp., b-c – *Pinus sylvestris*), d – radial section of a chip resulting from processing wood of *Pinus sylvestris*. Photo: J. Michalik

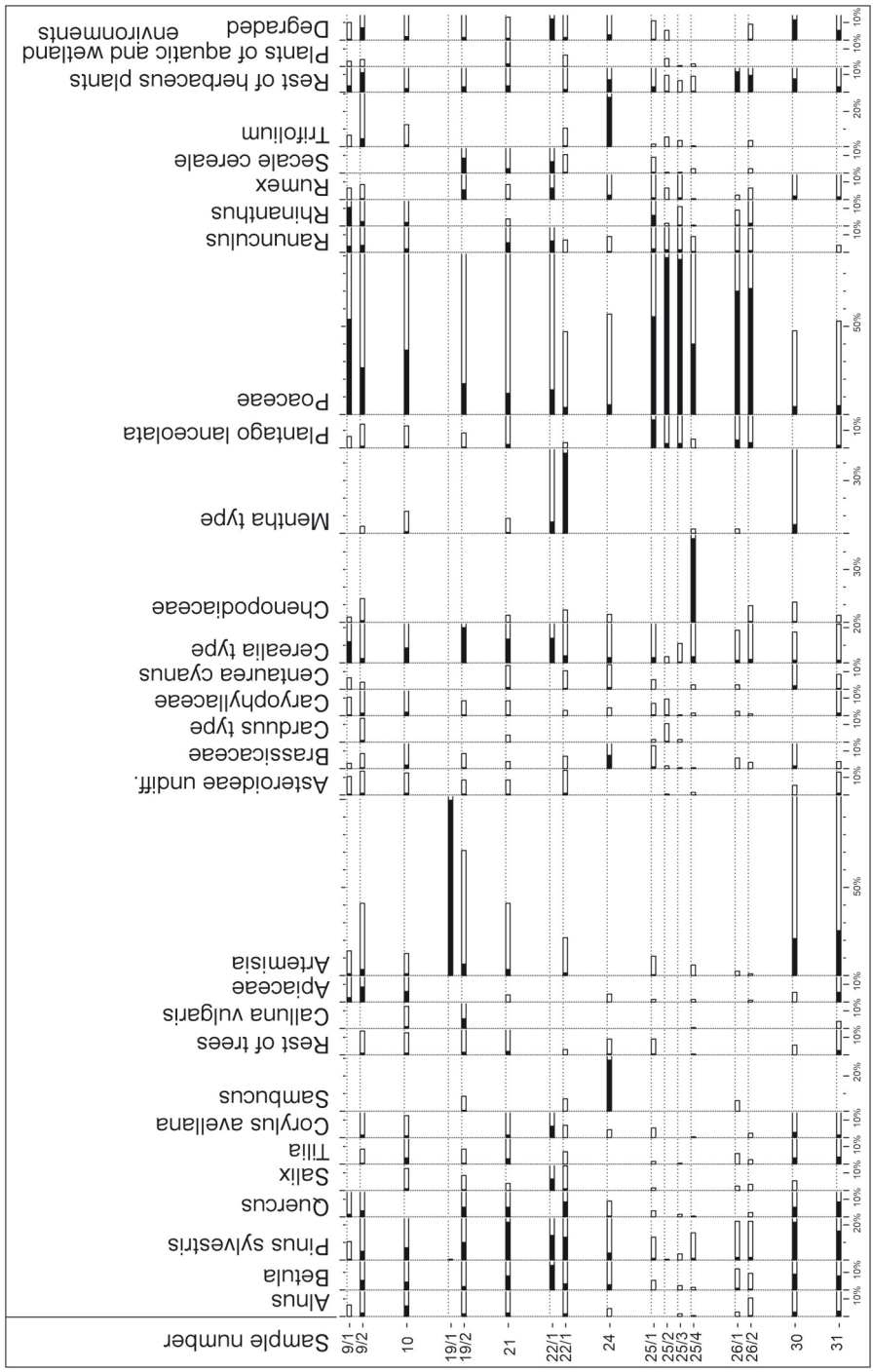

Fig. 6. Białowąs – pollen diagram with selected taxa (numbering of samples according to Table 1)

Table 2. Białowąs – list of vascular plants and Bryophyta in individual samples from coffins (numbering of samples according to Table 1); + – 55-70 specimens, ++ – 71-100 specimens, +++ – over 100 specimens; x – presence of mosses; CAT – ecosociological category of plants: CR – field crop, GA – garden plants, GR – grassland plants, WE – weeds, OW – other wild plants, UN – unclassified; *cultivated or weed; ** – cultivated or gathered

Taxon	CAT	Type of remains	Coffin 9		Coffin 10	Coffin 19		Coffin 21	Coffin 22		Coffin 24	Coffin 25				Coffin 26		Coffin 30	Coffin 31
			9/1	9/2	10	19/1	19/2	21	22/1	22/2	24	25/1	25/2	25/3	25/4	26/1	26/2	30	31
Adoxaceae																			
Sambucus nigra L. elder	OW	seed	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Alismataceae																			
Alisma plantago-aquatica L. european water plantain	OW	fruit	-	-	-	-	-	-	-	-	-	8	1	1	-	-	-	-	-
Amaranthaceae (=Chenopodiaceae)																			
Chenopodium album L. fat hen	WE	fruit	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
Apiaceae																			
Angelica sylvestris L. wild angelica	OW	fruit	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Heracleum cfr *sybiricum* L. hogweed	GR	fruit	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asteraceae																			
Asteraceae indet. aster family	UN	flower	-	-	-	-	-	-	-	-	-	2	25	-	-	-	-	-	-
		fruit	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-
Artemisia absinthium L. common wormwood	GA	flower	-	-	-	+++	-	-	-	-	-	-	-	-	-	-	-	-	-
Carduus crispus L. welted thistle	WE	fruit	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
Centaurea cyanus L. cornflower	WE	flower	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
Centaurea jacea L. brown knapweed	GR	fruit	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-
Sonchus arvensis L. perennial sow-thistle	WE	fruit	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
Sonchus asper (L.) Hill. prickly sow thistle	WE	fruit	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 2.

Taxon	CAT	Type of remains	Coffin 9		Coffin 10	Coffin 19		Coffin 21	Coffin 22		Coffin 24	Coffin 25				Coffin 26		Coffin 30	Coffin 31
			9/1	9/2	10	19/1	19/2	21	22/1	22/2	24	25/1	25/2	25/3	25/4	26/1	26/2	30	31
Taraxacum officinale L. common dandelion	GR	fruit	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Brassicaceae																			
Rorippa palustris (L.) Besser marsh yellow-cress	GR	seed	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cannabaceae																			
Humulus lupulus L. hop	CR	fruit	4	13	1	29	-	+	-	52	1	+++	6	+++	-	39	+++	+	-
		bract	7	-	-	+	-	11	-	-	-	+++	+	-	-	-	-	++	-
		strobilus	-	-	-	6	+++	-	+++	-	-	++	-	-	+++	-	-	-	-
Caryophyllaceae																			
Cerastium holosteoides Fr. em. Hyl common mouse-ear chickweed	GR	seed	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
Lychnis flos-cuculi L. ragged-robin	GR	fruit	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-	-
		seed	-	1	-	-	-	-	-	-	-	-	15	-	-	-	-	-	-
Stellaria media (L.) Vill. common chickweed	WE	seed	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stellaria sp. stitchwort	UN	seed	-	-	2	-	-	-	-	-	-	-	-	-	-	1	-	-	-
Cyperaceae																			
Carex cfr *canescens* L. hoary sedge	GR	fruit	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
Carex elata All. tufted-sedge	GR	fruit	-	-	2	-	-	-	-	-	-	-	13	-	-	31	-	-	-
Carex elata All./*nigra* (L.) Reichard tufted-sedge/common sedge	GR	fruit	-	-	-	-	-	-	-	-	-	-	++	4	-	-	2	-	-
Carex hirta L. hairy sedge	GR	fruit	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
Carex nigra (L.) Reichard common sedge	GR	fruit	-	-	10	-	-	-	-	-	-	11	33	4	-	-	-	-	-

Carex ovalis Gooden. oval sedge	GR	spike	-	-	-	-	-	-	-	-	-	-	++	-	-	-	-	-	-
		fruit	-	-	-	-	-	-	-	-	-	15	52	+	-	-	-	-	-
		utricle	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
Carex pallescens L. pale sedge	GR	fruit	-	-	-	-	-	-	-	-	-	2	+++	10	-	-	-	-	-
Carex panicea L. carnation sedge	GR	fruit	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
Carex paniculata L. greater tussock-sedge	GR	fruit	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
Carex cfr *pseudocyperus* L. cyperus sedge	GR	fruit	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-
Carex rostrata Stokes bottle sedge	GR	fruit	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		utricle	-	-	-	-	-	-	-	-	-	-	-	-	-	7	1	-	-
Carex cfr *rostrata* Stokes bottle sedge	GR	fruit	-	-	-	-	-	-	-	-	-	-	31	-	-	-	-	-	-
Carex spicata Huds. spiked sedge	GR	fruit	-	-	-	-	-	-	-	-	-	1	-	4	-	-	-	-	-
Carex vesicaria L. bladder sedge	GR	fruit	-	-	-	-	-	-	-	-	-	-	14	-	-	-	-	-	-
Carex vulpina L. true fox-sedge	GR	fruit	-	-	-	-	-	-	-	-	-	-	8	3	-	-	-	-	-
Carex sp. sedge	GR	spike	-	-	-	-	-	-	-	-	-	-	8	-	-	-	-	-	-
		fruit	-	-	1	4	-	-	-	-	-	-	-	26	-	-	-	-	-
		utricle	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-
Eleocharis palustris (L.) Roem. & Schult./ *uniglumis* (Link) Schult. creeping spike rush/slender spike rush	GR	fruit	-	-	-	-	-	2	-	-	2	1	-	1	-	-	-	-	-
Fabaceae																			
Astragalus sp. milkvetch	UN	fruit	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
		seed	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-
Fabaceae indet. legume family	UN	flower	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 2.

Taxon	CAT	Type of remains	Coffin 9		Coffin 10	Coffin 19		Coffin 21	Coffin 22		Coffin 24	Coffin 25				Coffin 26		Coffin 30	Coffin 31
			9/1	9/2	10	19/1	19/2	21	22/1	22/2	24	25/1	25/2	25/3	25/4	26/1	26/2	30	31
Lotus corniculatus L. common bird's-foot-trefoil	GR	fruit	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-
		seed	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-	-
Trifolium pratense L. red clover	GR	calyx	-	-	-	-	-	-	-	-	2	-	+	-	-	7	-	-	-
Trifolium pratense L./ *repens* L. red clover/white clover	GR	petal	-	-	-	-	-	-	-	-	-	-	-	-	-	6	-	-	-
Trifolium repens L. white clover	GR	calyx	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
Fagaceae																			
Quercus sp. oak	OW	acorn	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	++	0,5
Juncaceae																			
Juncus cfr *effusus* L. soft-rush	GR	fruit	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-
Juncus sp. rush	GR	seed	-	-	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lamiaceae																			
Galeopsis tetrahit L. common hemp-nettle	WE	fruit	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mentha aquatica L. water mint	GR	fruit	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Prunella vulgaris L. selfheal	GR	fruit	-	-	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Linaceae																			
Linum catharticum L. fairy flax	GR	fruit	-	-	-	-	-	-	-	-	-	-	7	-	-	-	-	-	-
cfr *Linum catharticum* L. fairy flax	GR	fruit	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
Orobanchaceae																			
Rhinanthus serotinus (Schönh) Oborny. narrow-leaved rattle	GR	seed	-	1	-	-	-	-	-	-	-	-	4	14	-	11	2	-	-
		fruit	-	-	-	-	-	-	-	-	-	-	8	-	-	6	-	-	-

Poaceae																			
Agrostis vinealis Schreb. brown bent	GR	floret	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Avena sativa L. oat	CR	glume	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
Avena sp. oat	CR*	fruit	-	-	-	-	2	4	-	-	-	-	-	-	-	-	1	-	-
Festuca sp. fescue	GR	floret	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-
Glyceria fluitans (L.) R. Br. floating sweet-grass	GR	floret	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		glume	-	2	-	-	-	-	-	-	-	-	4	-	-	28	-	-	-
cfr *Holcus lanatus* L. yorkshire-fog	GR	glume	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-
Panicum miliaceum L. millet	CR	floret	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
Poa angustifolia L. narrow-leaved meadow-grass	GR	floret	-	-	-	-	-	-	-	-	-	-	+++	-	-	-	-	-	-
Poa chaixii Vill. broad-leaved meadow-grass	GR	floret	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Poa compressa L. flattened meadow-grass	GR	floret	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Poa palustris L. fowl meadow-grass	GR	floret	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-
Poa pratensis L. common meadow-grass	GR	floret	-	-	-	-	-	-	-	-	-	-	+	5	-	11	-	-	-
Poa sp. meadow-grass	GR	floret	-	-	-	-	-	-	-	-	-	++	11	-	-	43	-	-	-
Poaceae indet. grass family	UN	ear	-	-	-	-	-	-	-	-	-	-	++	-	-	-	-	-	-
		floret	5	-	4	-	-	-	-	-	-	-	-	21	-	-	-	-	-
Secale cereale L. rye	CR	ear	-	-	-	-	-	-	-	2	3	-	-	-	-	-	-	-	-
Polygonaceae																			
Fagopyrum esculentum Moench common buckwheat	CR	fruit	-	-	-	-	-	-	-	1,5	-	-	-	-	-	-	-	-	-
Polygonum aviculare L. knotgrass	WE	fruit	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-

Table 2.

Taxon	CAT	Type of remains	Coffin 9		Coffin 10	Coffin 19		Coffin 21	Coffin 22		Coffin 24	Coffin 25				Coffin 26		Coffin 30	Coffin 31
			9/1	9/2	10	19/1	19/2	21	22/1	22/2	24	25/1	25/2	25/3	25/4	26/1	26/2	30	31
Polygonum hydropiper (L.) Delarbe water-pepper	WE	fruit	-	-	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rumex acetosa L. common sorrel	GR	fruit	-	-	-	-	-	-	-	-	-	-	14	1	-	-	-	-	-
		perianth	-	-	-	-	-	-	-	-	-	-	27	-	-	-	-	-	-
Rumex acetosella L. sheep's sorrel	WE	fruit	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-
Rumex crispus L. curled dock	WE	perianth	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-
Rumex obtusifolius L. broad-leaved dock	WE	fruit	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
Rumex thyrsiflorus Fingerh. compact dock	WE	fruit	-	-	-	-	-	-	-	-	-	-	-	-	-	6	1	-	-
Rumex sp. dock	UN	perianth	-	-	-	-	-	-	-	-	-	1	3	-	-	-	-	-	-
Ranunculaceae																			
Caltha palustris L. marsh-marigold	GR	fruit	-	-	3	-	-	-	-	-	-	4	+++	8	-	33	8	-	-
Ranunculus acris L. meadow buttercup	GR	fruit	3	-	1	-	-	2	-	-	-	4	+++	45	-	-	1	-	-
Ranunculus flammula L. lesser spearwort	GR	fruit	28	2	-	-	-	1	-	-	-	-	-	-	-	1	-	-	-
Ranunculus repens L. creeping buttercup	GR	fruit	1	-	-	-	-	1	-	-	3	4	54	+	-	-	-	-	-
Ranunculus cfr *repens* L. creeping buttercup	GR	fruit	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rosaceae																			
Malus sp.** apple	CR	seed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-
Malus sp./*Pyrus* sp.** apple/pear	CR	seed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-

Rubus idaeus L. raspberry	OW	endocarp	-	2,5	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sorbus aucuparia L. rowan	OW	seed	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Urticaceae																			
Urtica dioica L. stinging nettle	WE	fruit	-	-	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Undetermined																			
varia	UN	-	6	1	2	-	-	-	-	1	-	-	5	-	-	4	-	-	-
Bryophyta																			
Calliergonella cuspidata (Hedw.) Loeske pointed spear-moss	GR	stems	x	-	-	-	-	x	-	-	x	-	x	-	-	x	x	-	-
Drepanocladus aduncus (Hedw.) Warns kneiff's hook-moss	GR	stems	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-
Drepanocladus vernicosus (Mitt.) Hedenas slender green feather-moss	GR	stems	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-
Plagiomnium sp. plagiomnium moss	GR	stems	-	-	-	-	-	-	-	-	-	-	x	-	-	-	-	x	-
Rhytidiadephus squarrosus (Hedw.) Warns springy turf-moss	GR	stems	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	-

RESULTS

Coffin 9 – Joachim Casimir von Glasenapp (1731-1780)

The archaeobotanical samples represented the upper (Sample 9/1) and lower (Sample 9/2) parts of the burial. A plant occurring at both locations was *Humulus lupulus*, preserved as fruits and bracts. In addition to hop, numerous other plant remains were found, particularly in the upper part of the coffin. Most remains included *Carex rostrata*, *Glyceria fluitans,* and *Ranunculus flammula*. These plants grow in wet meadows, swamps, or along riverbanks. *Calliergonella cuspidata*, a moss whose single-stemmed leaves were found in a sample from the upper part of the coffin (Table 2), also occurs in similar environments.

The palynological picture of both samples showed relatively high sporomorph participation (over 200 in each). Poaceae pollen was the most abundant, accounting for over 20% of the total amount in both samples. There was also relatively high participation of Cerealia type, *Rhinanthus*, Apiaceae, and *Trifolium* pollen (Fig. 6). *Juncus* pollen appeared individually, which, in comparison with the overall pollen pattern, may indicate that the plants that were put in the coffin were collected from wet meadows surrounded by mixed forests.

The wood chips present in the bottom sample were identified as *Pinus sylvestris* (Table 3).

Coffin 10 – probably Margaretha Christiane *de domo* von Podewils (1739-1799)

According to the excavation reports, the plant remains preserved at the bottom of the coffin were listed as straw; however, this description is incorrect. The main component of the sample was the vegetative parts of herbaceous plants. Among them, the fruits of *Carex nigra*, and *Prunella vulgaris* have been identified in fairly large quantities (respectively 10 and 18) (Table 2). Both plants can grow in meadows and pastures, as well as in swamps and on riverbanks (Nawara 2015, 80, 236). Less numerous were the fruits of *Polygonum hydropiper*, which can also grow in damp environments.

The palynological spectra presented a low proportion of sporomorphs (fewer than 100 grains in total). Many of them presented significant deterioration, including thinning of

Table 3. Białowąs – results of xylological analysis of wood chips; *- only coarser wood chips

Sample	Number of wood chips	Taxa	
		Pinus sylvestris	*Quercus* sp.
9/2	10	10	-
10	10	5	5
24	10	10	-
30	10	10	-
31	10	7	3*

the cell membrane. Poaceae and Cerealia type pollen were the most abundant in the sample, with *Artemisia*, *Lotus*, *Mentha* type, *Plantago lanceolata*, *Trifolium*, Asteroideae undiff., and Caryophyllaceae pollen recorded individually. The palynological spectrum indicated that the plants placed in the grave originated from an anthropogenic environment (a meadow or a field). The overall spectral pattern, combined with the relatively small amount of pollen, may suggest that flowering plants were not intentionally deposited here.

Pinus sylvestris and *Quercus* sp. wood chips were identified in the sample.

Coffin 19 – Female, died *in senilis*, around the mid-18th century

For this coffin, the two collected samples differed in the types of macroscopic plant remains. Material from the upper part of the coffin consisted of fragments of rigid stems of herbaceous plants. On some of the stems, flower heads (capitulum) were preserved. They belonged to *Artemisia absinthium*. *Humulus lupulus* remains were mixed in the sample, and they were the only element of the sample from the lower part of the coffin.

Significant variation in botanical composition was also observed based on pollen analysis, both in the number and taxonomic diversity of pollen. The sample from the upper part of the coffin showed a high pollen concentration, with more than 1000 grains counted. The pollen represented only one genus – *Artemisia*. The state of preservation of its pollen suggests that specimens with flowers at different stages of development were placed in the coffin. This palynological pattern was completely different for the sample representing the lower part of the coffin (Fig. 6). The sample from the lower part of the coffin was characterised by a low pollen content (112 specimens) and a relatively high taxonomic diversity (22 taxa). Among the trees and shrubs, *Quercus* (6%) and *Pinus* (10%) pollen dominate, and among the herbaceous plants: Cerealia type (20%), Poaceae (18%), *Secale cereale* (9%), *Artemisia* (7%), and *Rumex* (6%) were identified. Other taxa were represented by single pollen grains. The overall botanical picture of the sample in question suggests that the lower part of the coffin probably did not contain intentionally deposited flowering plant specimens. Taken together with the macrobotanical results, it can be inferred that the hops were collected from an agricultural area adjacent to fields sown with cereals.

Coffin 21 – Barbara Augusta von Glasenapp (1711-1785)

In the sample collected from the coffin of Barbara Augusta, only a few macroremains were found. Among them, *Humulus lupulus* fruits and single finds of Asteraceae, Cyperaceae, Fabaceae, Linaceae, Poaceae, Polygonaceae, and Ranunculaceae were isolated, and a few leafy stems of *Caliergonella cuspidata* were found.

The pollen spectrum is characterised by relatively high participation and high diversity of sporomorphs. 220 sporomorphs belonging to 36 taxa were counted on one slide. However, only 12 of these accounted for more than 2% (Fig. 6). As many as 10 of these represent trees and shrubs and account for 47% of the total pollen. Among the herbaceous plants, Cerealia type, Poaceae, *Artemisia,* and *Secale cereale* again accounted for the highest

share. The sharing of non-pollen palynomorphs in the form of residual mycelial hyphae is also relatively high. The obtained pollen spectrum suggests that the origin of the sporomorphs is accidental and does not involve the deliberate addition of some specific flowering plants into the coffin.

Coffin 22 – probably Caspar Otto von Glasenapp (before 1613-1665)

Both macroremain samples had similar botanical compositions. They contained a large quantity of *Humulus lupulus* in the form of fruits and strobili.

The palynological picture differs significantly from the macroremains. Samples differ in both the value of taxonomic diversity (11 taxa in the sample from the head area and 29 from the pelvic area) and the abundance of pollen recognised (275 and 14 specimens, respectively). Mycelial shreds were present in both samples. In the sample from the head area, up to 46% of the accumulated pollen belongs to the Lamiaceae family (of the *Mentha* type). Considering other herbaceous plants, *Artemisia* (2.2%), Cerealia type (4.5%), and Poaceae (4.5%) were also found (Fig. 6). For trees and shrubs, *Betula* (4%), *Pinus* (14%), *Quercus* (9%), *Alnus* (1.8%), *Salix* (1.5%), *Tilia* (0.7%), *Corylus* (0.7%), and *Sambucus* (0.7%) were present. Most of these reflect a general picture of the environment in which plant collection for funerary rites occurred. The distinct dominance of *Mentha* type pollen in the sample from the head area may indicate the intentional placing of flowering specimens of this plant in a coffin, perhaps in the form of a pillow. The botanical composition of the sample from the pelvic area is probably the result of accidental pollen deposition from outside of the coffin. It is not related to the plants put in the coffin.

Coffin 24 – unknown man, died at approximately 21 years of age, around the mid-18th century

The plant macroremains collected from the coffin were severely damaged. The best-preserved element of the sample was *Pinus sylvestris* wood chips. Among them, single fruits of *Humulus lupulus* and *Ranunculus repens,* and flowers of *Trifolium pratense* were preserved. In addition, a *Sambucus nigra* seed, fragments of a *Quercus* sp. fruit, and a *Secale cereale* ear were found.

The palynological sample is characterised by a relatively high participation of highly degraded sporomorphs. A total of 208 pollen grains were counted on two slides. Their poor state of preservation, especially the heavily damaged (unrecognisable) sculptures and a significant proportion of fungal spores, indicates unfavourable environmental conditions. The palynological spectrum is characterised by a dominance of *Trifolium*, probably *T. pratense* (29%) and *Sambucus* (29%). The remaining herbaceous taxa are fewer in number. Only Poaceae and Brassicaceae pollen occur above 4%. The resulting pollen picture may indicate that *Trifolium* and *Sambucus* flowers were intentionally placed in the coffin. The other pollen was likely deposited accidentally.

Coffin 25 – unknown man died *in senilis*, 18th/19th century

All four samples were the richest in plant macroremains and the most diverse considering other materials. Two of them (Samples 25/1 and 25/4) were collected near and below the head of the deceased, and these materials may have been used to form a kind of pillow. In both samples, *Humulus lupulus* remains were the predominant element, along with secondary contributions of sedge fruits.

Samples 25/2 and 25/3 consisted of vegetative parts of herbaceous plants (Fig. 4). Some of these were certainly sedges, as numerous fragments of ears and fruits of *Carex pallescens, C. ovalis, C. elata/nigra*, and *Carex vesicaria* were found in both. Sample 25/2 also contained significant amounts of fruits of *Caltha palustris*, and *Ranunculus acris* and florets of *Poa angustifolia*. A characteristic element of this sample was *Rhinanthus serotinus,* preserved as fruits and seeds. All of these species are associated with wet meadows. In addition, the material remains of ruderal plants in Sample 25/3 contained a similar composition, but much fewer diaspores were found. In Sample 25/2, stems with leaves of *Caliergonella cuspidata* and *Plagiomnium* sp. were identified.

All four pollen samples were characterised by a relatively high participation of sporomorphs (25/1 – 517, 25/2 – 1020, 25/3 – 1032, 25/4 – 935). Among these, the pollen of trees and shrubs was very poorly represented (4-0.1%) in all samples. A high participation of grass (Poaceae) pollen was found – 56% and 40% in the samples taken from the head area (respectively 25/1, 25/4), and 89% in each of the two other (Samples 25/2 and 25/3). In many cases, Poaceae pollen formed conglomerates, with some clusters exceeding 50 grains. Samples taken from the head area (25/1 and 25/4) exhibit a similar pollen pattern, except for the presence of three taxa: *Plantago lanceolata*, Chenopodiaceae, and *Rhinanthus*. A relatively high proportion of *Plantago lanceolata* and *Rhinanthus* pollen was recorded in Sample 25/1 (16.5% and 6.5%, respectively), which was virtually absent in Sample 25/4 (Fig. 6). It is worth mentioning that individual specimens of *P. lanceolata* were preserved in various sizes. Sample 25/4 is characterised by a significant proportion of Chenopodiaceae pollen (48%), which also occurred in clusters of up to 50 grains. No pollen of this type was found in Sample 25/1. Taking all these observations into account, it can be assumed that flowering plants with varying degrees of flower development were deposited in the head area, with the cushion filling under the skull consisting mainly of plants from the Chenopodiaceae family. In the pollen spectra, samples taken from this coffin also showed sporomorphs of aquatic and wetland plants such as *Juncus* sp., *Alisma plantago-aquatica* type, and *Batrachium trichophyllum* (included in the summary curve 'Plants of aquatic and wetland environments', Fig. 6). Although these are single grains, they may indicate that some of the plants, most probably grasses, placed in the coffin were collected from a wetland. The overall pollen spectrum suggests that the material deposited in Coffin 25 originated from wet, highly anthropogenically transformed plant communities.

Coffin 26 – unknown man died *in senilis*, 18th/19th century

The head and foot areas were sampled for organic material. The common element in both samples was *Humulus lupulus*, although material collected near the head (Sample 26/2) contained more hop remains. Sample 26/1 contained an average amount of *Carex* sp. and *Caltha palustris* remains, whereas they were rare in Sample 26/2. The latter also contained single seeds of *Malus* sp. and *Malus* sp./*Pyrus* sp. Three species of moss were noted. *Calliergonella cuspidata* was present in both samples, whereas *Drepanocladus aduncus* was present only in the material near the head and *D. vernicosus* near the foot.

The pollen samples collected from Coffin 26, like those from 25, were characterised by a relatively high proportion of sporomorphs, with trees and shrubs represented by a very low proportion of pollen (about 5%) and a high participation of Poaceae (about 70-72%). In some cases, Poaceae pollen formed clusters of dozens of pollen grains. This is likely the result of using grasses with inflorescences at various stages of flowering and flower development. In undeveloped specimens, the pollen remained in the anthers, hence the pollen clusters visible in pollen spectra. Of the remaining plants, only *Plantago lanceolata*, Cyperaceae, and Cerealia type pollen demonstrated significant proportions.

Coffin 30 – coffin with the secondary deposit of remains of six people: two men, two women who died *in senilis*, one man who died *in maturus*, and one gender-indeterminate adult, early 19th century

The macrobotanical composition of the samples from Coffin 30 was poor. It consisted mainly of numerous remains of *Humulus lupulus* together with fragments of fruits of *Quercus* sp. Stems of *Rhytidiadelphus squarrosus* and *Plagiomnium* sp. were also found. The wood chips collected were exclusively *Pinus sylvestris*.

The palynological sample showed a relatively low pollen concentration. A total of 224 sporomorphs were counted in this sample; however, up to 119 spores of the indicator were added at the beginning of the maceration. The proportion of degraded pollen, identified by loss of diagnostic features, was also high. Additionally, numerous fungal and moss spores were present. In the general pollen spectrum, almost half of the recognised specimens were pollen from trees and shrubs, mainly *Pinus* (22%), *Betula* (10%), and *Quercus* (6%). Among the herbaceous plants, the most common pollen were *Artemisia* (26%), *Mentha* type (6%), and Poaceae (5%), which could have been deliberately placed in the coffin. Among the NPP (Non-Pollen Palynomorphs), in addition to the spores of fungi and mosses, there are also vegetative microremains of plants from the Lamiaceae family, to which the *Mentha* type belongs. This clearly shows that the coffin contained flowering plants of the Lamiaceae family and the *Artemisia* genus. The other plants were less numerous, but in general, it can be assumed that the environment from which they came was anthropogenically transformed. It cannot be excluded that the image obtained was the result of selective pollen decomposition.

Coffin 31 – unknown man died *in senilis*, 18th/19th century

The samples from Coffin 31 contained numerous chips of *Pinus sylvestris* and *Quercus* sp. It is worth noting that only thicker chips (up to 3 mm) were from oak, and thinner ones (0.2-1 mm) from pine. There was only one fragment of a *Quercus* sp. fruit.

The sample was characterised by a very low pollen concentration. Similar to Sample 30, pollen from trees and shrubs was relatively high (17% – *Pinus*, 9% – *Quercus*, 8% – *Betula*, and 5% – *Tilia*). Of the herbaceous plants, as much as 26% was *Artemisia*, 6% – Poaceae, and 2.5% – *Plantago lanceolata*. The remaining taxa accounted for less than 2%. However, as in the case of the sample from Coffin 30, the overall picture of the pollen spectrum indicates an anthropogenically modified environment. It is likely that the only flowering plants intentionally placed in this grave were *Artemisia* and Poaceae. The pollen of other plants could have arrived there more or less accidentally, as the pollen fall coincided with the burial or collection period of plants deliberately placed there.

BOTANICAL ASPECTS OF THE VON GLASENAPP FAMILY BURIALS

Despite considerable damage to the individual burials, the archaeological work in the von Glasenapp family crypt has produced well-preserved archaeobotanical material. The majority of the identified taxa represent plants that are common in Poland and were probably part of the communities developing in the vicinity of Białowąs.

The most comprehensive picture is that of Coffin 25 (an unknown man who died in senilis), where 44 plant taxa were identified from macroremains and 46 taxa were determined by pollen analysis. The macrobotanical spectrum of all four samples from this burial is quite consistent. A small difference lies in the abundance of remains of individual plants. First of all, it can be noted that a high concentration of *Humulus lupulus* cones was preserved in the head area. However, the palynological spectrum from the same area showed a low percentage of hop pollen. This confirms the selective and targeted use of female *H. lupulus* specimens (Jarosińska *et al.* 2019, 192). However, in the sample taken from beneath the skull, a large proportion of Chenopodiaceae pollen was identified. Hop remains were also present in the other two samples, but mainly in the form of fruits and individual bracts, which could easily move in the coffin as a result of its destruction. It can, therefore, be assumed that hops were deposited in the upper part of the coffin, in the area where the pillow was usually placed. It is likely that flowering specimens of Chenopodiacea, whose pollen was abundant in this sample, probably grew near the collected hop.

The second component found in all four samples from Coffin 25 was the remains of plants originating from different types of meadows. Most of them represented communities within the order *Molinietalia caerule*, which includes meso- and eutrophic hay meadows, as well as permanently and periodically wet riparian tall herb fringes (Matuszkiewicz

2008, 124). One of the characteristic components must have been sedges (*Care*x sp.), preserved not only as fruits but also as fragments of spikelets. Significant accumulations of sedge remains, and their considerable taxonomic diversity (eight species), were found in Sample 25/2, representing the upper part of the coffin. This sample was dominated by *Carex pallescens*, *C. ovalis,* and *C. nigra*. The first of them prefers moist, grassy or rocky habitats at the edge of the forest, where it receives partial sunlight (Sikorski *et al.* 2020, 241), whereas *C. ovalis* is found on poor, dry grassland and damp pastures (Sikorski *et al.* 2020, 137), and *C. nigra* inhabits wet meadows or marshy riverbanks (Nawara 2015, 80). The latter may have occurred alongside *Caltha palustris*, which has been preserved as numerous fruits. It is possible that these species were accompanied by *Ranunculus acris, R. repens, Glyceria fluitans, and Lychnis flos-cuculi*. The results of the palynological analysis of Coffin 25 showed that a significant proportion of the pollen was from Poaceae, *Plantago lanceolata,* and *Rhinanthus*. The most obvious explanation for this situation would be the use of hay as 'bedding' material inside the coffins. Similar results have been observed in studies of burials in Europe from the Middle Ages to the modern period (*e.g.*, Deforce *et al.* 2015, 599; Tranberg 2015, 192). It is also possible that the sample taken near the head may have reflected a bouquet of wildflowers, including cereals (such as *Plantago lanceolata*, Poaceae, *Rhinanthus*, *Secale cereale*, and Cerealia type), and it cannot be ruled out that a bouquet of herbs was placed in the coffin near the head.

There is a clear difference in taxon diversity between Coffin 25 and the others. In stark contrast, Coffin 31 yielded the fewest taxa based on macrobotanical remains. This may be because this sample contained mainly pine and oak chips, possibly indicating that the coffin was lined primarily with wood shavings. However, the palynological analysis of Coffin 31 revealed the presence of plants (*e.g.*, Apiaceae, *Artemisia*, and Poaceae) that may have been deposited in the coffin, the macrobotanical remains of which have not been preserved. In addition, a relatively high taxonomic diversity and a high percentage of tree pollen are present (10 genera: *Acer*, *Alnus*, *Betula, Carpinus*, *Corylus*, *Fagus*, *Picea*, *Pinus*, *Quercus*, and *Tilia*).

In the other coffins, the number of taxa identified macroscopically ranged from 4 to 29 determinations. Most of these species were grassland plants characteristic of meadows and pastures (Fig. 7). Their remains were found in almost all samples. In Joachim Casimir von Glasenapp's burial (Coffin 9), of the 14 identified plants, 10 were associated with grasslands. The palynological spectrum also revealed the presence of plants typical of wet meadows. This may mean that hay and other plants were a part of the lining of Coffin 9, but due to the extent of its destruction, we do not have clear evidence of this, as in the case of Coffin 25.

While hop was prevalent in Coffin 25, it also appeared in other coffins, regardless of the location of the samples. Particularly large quantities of plant remains were noted in Burials 19, 22, and 26; however, it is not possible to determine whether the cones supported the heads of the deceased or lined the rest of the coffins. Hop remains are among the most

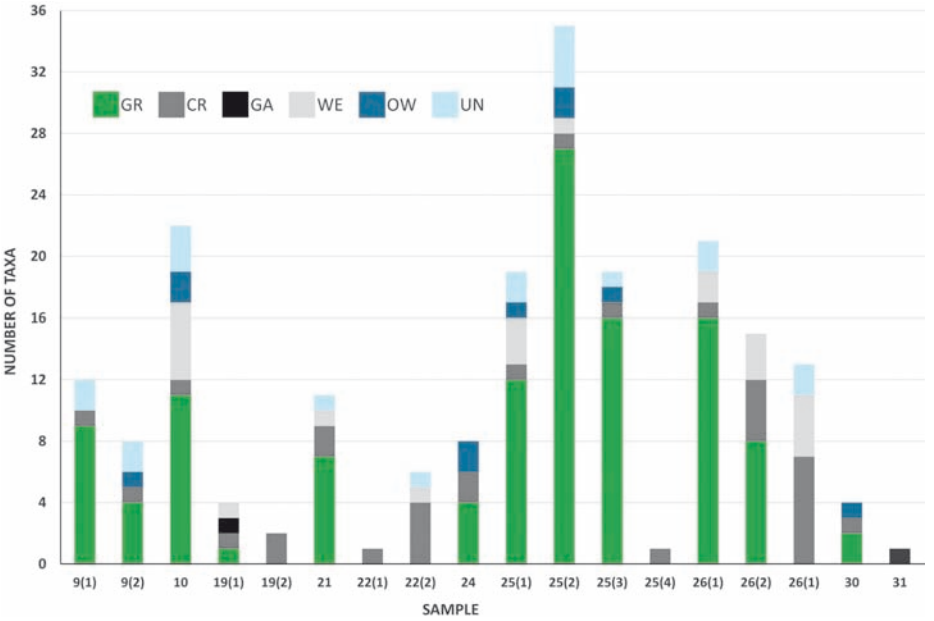

Fig. 7. Białowąs – number of taxa in groups of potential origin. GR – grassland plants, CR – field crop, GA – garden plants, WE – weeds, OW – other wild plants, UN – unclassified (numbering of samples according to Table 1)

common botanical remains found in burials dating to the early modern period in Poland (*e.g.*, Rożek 2009, 188; Jarosińska *et al.* 2019; Badura *et al.* 2023, 92; Badura and Noryśkiewicz 2023, 156) and Europe more broadly (*e.g.*, Wiethold 2005; Ströbl and Vick 2007, 52, 53). In all these cases, only female plants were used, which is connected with their botanical properties. Female specimens produce 2.5-5 cm long cone-like structures called strobili, which consist of yellowish-green, overlapping bracts attached to an axis. Each bract enfolds a small fruit, or achene. Unfortunately, in the case of Białowąs, we do not know whether these specimens were cultivated or gathered from the wild. In Coffin 22, the high proportion of macroscopic hop remains is accompanied by high percentages of *Mentha* type pollen. This could indicate the collection of hops from moist places, possibly from wild sites.

In addition to hops, traces of other useful plants were also found in the samples. These were both cultivated (*Artemisia absinthium*, *Avena sativa, Fagopyrum esculentum, Panicum miliaceum,* and *Secale cereale*) and gathered (*Malus* sp., *Pyrus* sp., *Rubus idaeus*, *Sambucus nigra,* and *Sorbus aucuparia*) plants. Cereals (millet, oats, rye) and buckwheat are often noted in burials as symbols of food and as an important element of Catholic church traditions. The presence of apple/pear, raspberry, or rowan remains is more problematic. It does not appear that these plants were used deliberately. It is more likely that they represent contemporary contamination, brought in by people or animals during the

abandonment and destruction of the crypt. Moreover, Sample 19/1 presented relatively homogeneous material. *Artemisia* pollen, at various stages of development, was abundant in the palynological spectrum. Flowers or whole flowering specimens of *Artemisia* were deposited in the upper part of the coffin and may have been its padding or filled the pillow. Macroscopic material allowed the determination that Artemisia absinthium was specifically used in this case.

It is well known that one of the significant difficulties in funerary research is determining the time of death and burial, notably when there are no archaeological or historical sources on the subject. The plant material may provide some information, primarily if the remains represent plants from a specific community. However, it must be noted that without other dating methods, plants can only indicate the season in which they were collected, an approach well known in archaeobotanical research (Lityńska-Zając and Wasylikowa 2005, 475-476). The considerable taxonomic diversity of Sample 25/2, combined with the fact that the identified plants were likely collected from a single location (a wet meadow), allows us to attempt a phenological description. Seventeen out of 21 taxa are plants that flower and fruit in June and July, that is, at the end of early and the beginning of the whole summer (Stankiewicz 2022, 31). It should be noted, however, that dried plants were usually placed in coffins so they could be used at any time that did not coincide with their flowering or fruiting period.

HOP AND HAY AS ELEMENTS OF THE FUNERAL RITES

With the Reformation came a rejection of the lavishness previously associated with Catholic funerary ceremonies. The belief in purgatory was abandoned (Korpiola and Lahtinen 2015, 15), and moderation in the preparation and burial of the individual was advocated (Grupa 2011, 23). Funerals were modest, with exceptions made for members of the upper social classes (Ogiewa-Sejnota 2020, 123). This may explain the ambiguous nature of the von Glasenapp family grave furnishings, both in terms of the botanical materials and goods (*e.g.*, rings, cufflinks). To some extent, Protestants adopted elements of Catholic ceremonial splendour (Chrościcki 1974, 54). However, they had rejected the belief that posthumous prayer and ceremony could influence the fate of the deceased's soul (Macionczyk 2023, 86). The focus shifted from the cult of death to the memory and care of the graves of the deceased (Guzowski *et al.* 2016a, 28). The Reformation changes also restricted the use of wreaths and plants, although the specifics varied from region to region (Grupa 2011; Łuczaj 2012, 229; Witkowska 2018, 287; Macionczyk 2023).

Protestants used both natural and artificial materials to create wreaths. Secular and ecclesiastical authorities also regulated the modesty of coffin furnishings; however, these rules were often not followed in the burials of nobility or distinguished individuals. On the other hand, branches of Protestantism, such as the Baptists, taught that death was the

separation of soul and body, and the funeral was an expression of respect for the deceased. The botanical composition of the graves in the church's crypt in Białowąs corresponds to Protestant funerary customs and their distinctive approach to death.

Indeed, the coffins in question were lined with hay. References to this practice have been known in Europe since the Viking times (Lempiäinen-Avci and Alenius 2017, 18). In Poland, specifically, this practice has been documented since the 17th-18th centuries (Pińska *et al.* 2015, 323). Dry herbaceous plants and mosses may have formed a kind of mattress or pillow (Hansson 2005, 50; Deforce *et al.* 2015, 601; Tranberg 2015, 196). Unfortunately, in the case of the materials from Białowąs, it is difficult to determine the presence of this element due to the considerable mixing of the botanical remains. However, the evidence presented here – both macrobotanical and palynological – confirms that Coffins 9, 25 and 26 were filled with hay.

The dying were laid out on dry grass to await the last rites, and after death, the washed bodies were placed on it. Some sources suggest that hay was used to prepare the body for the vigil in the chapel or for transport to the burial site (Macionczyk 2023, 25). The ascetic nature of hay as a funeral material may be associated with Protestant doctrines that criticised worldly life and materialism (Guzowski *et al.* 2016b, 323). Hay, as an important agricultural product used to feed livestock, was obviously valued when allocated for sepulchral rites, suggesting it held a significant role in the funeral ceremony (Hansson 2005, 50). Along with hay, wood shavings, sawdust, conifer needles, or mosses could have been laid out under the body. Dried plant material could absorb bodily fluids and keep the coffin dry for as long as possible (Lempiäinen-Avci and Alenius 2017, 138; Macionczyk 2023, 106). Moreover, hay and moss, due to their flexible yet durable structure, allowed the body to be positioned appropriately and prevented movement during the transport of the coffin. This was crucial because the deceased was meant to appear as if in a state of sleep (Grupa 2005, 32, 52-53; Macionczyk 2023, 37). Mosses were also present in the Białowąs hay samples, but their presence appears to be due to co-occurrence with other grassland species. The use of pine shavings to line the coffin's base is also justified. The shoots of coniferous trees (such as the *Pinus sylvestris* found in Coffin 9) contain aromatic essential oils with antiseptic properties. Additionally, even if these shavings were byproducts of the coffin-making process, they were placed with the deceased to ward off bad luck for the living (Macionczyk 2023, 102).

One particularly significant plant taxon in both Catholicism and Protestantism is the common hop (*Humulus lupulus*). Its frequent appearance in archaeobotanical analyses from modern burials is due to the ease with which its cones and seeds can be identified and its widespread use in funerary practices, especially in 17th- and 18th-century Northern and Central Europe, including the Baltic states (*e.g.*, Lagerås 2016; Jarosińska *et al.* 2019; Badura *et al.* 2023; Badura and Noryśkiewicz 2023). Due to its lupulin content, hops were a natural preservative used in the production of beer and mead (Kujawska *et al.* 2016, 116). Parts of the plant were woven into Easter palms and blessed during the Feast of the

Assumption of Mary. In some regions of Poland, hops were considered a symbol of the groom and an emblem of vitality due to the way the plant climbs its support. *H. lupulus* was also used in love rituals. In agricultural rituals, it was employed during the first ploughing to ensure a good harvest, and hop leaves were used during storms for fumigation. During the removal of the deceased from the house, hop cones were scattered across the threshold to prevent the soul's return (Szcześniak 2013, 139).

Alongside hay, hops were the most common material used to fill pillows and coffin mattresses. Due to its strong scent, hops masked the unpleasant odour of the decaying body. The antibacterial and antifungal properties of substances found in this plant helped slow the decomposition of the corpse (Lagerås 2016, 12; Macionczyk 2023, 105). Dried hop cones demonstrated the ability to absorb fluids produced during the body's decomposition (Wiethold 2005, 31).

Due to hops' calming effects on the nervous system, this plant was believed to induce eternal sleep and bring peace. Thus, the practice of filling pillows with dried hop cones from blessed wreaths and bouquets became a common tradition among both Catholics and Protestants (*e.g.*, Wiethold 2005; Grupa 2011; Karg 2012/2013; Lagerås 2016; Jarosińska *et al.* 2019). This allowed the pillow to take on the appropriate shape, particularly when combined with hay and wildflowers. Importantly, the use of hop cones as coffin filling was not regulated by Protestant church rules. Hops, a valuable natural resource, could have been cultivated in the estate's garden belonging to the von Glasenapp family.

CONCLUSIONS

Funerary archaeology involves the analysis of human remains in their archaeological context, which in this case includes the crypt and its accompanying furnishings. Analysis of the botanical materials preserved in the coffins provides deeper insight into the cultural and social aspects of past societies. The research carried out in Białowąs is no exception. It should be noted that it is uncommon to encounter such extensive botanical materials from a single crypt. Despite the considerable damage at the site, the preserved plant remains enabled the description of the burial customs in ten interments of the von Glasenapp family, who exhibited considerable restraint in the quantity and type of plants used. This may be related to the fact that Protestantism sought to counter the opulence and grandeur of the Catholic funeral liturgy.

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