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Pollen Spectra from the Bronze Age Barrow at Egshvile, Thy, Denmark

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INTRODUCTION

The Bronze Age barrow at Egshvile, Thy, northwest Denmark, was excavated and described by Anne-Louise Haack Olsen (this volume). The barrow is situated on a morainal ridge south of the lake Nors Sø. Only its basal part was preserved, due to overplowing. The barrow was built in three phases. Phase 1 was 3 m in diameter and was built over an urn grave, not later than period II of the early Bronze Age (1500–1200 BC). Phase 2 was built over and around the barrow of phase 1 and was 9 m in diameter. It contained an urn grave from period II. In phase 3 a stone cist from period III (1200–1000 BC) was dug into the foot of the phase 2 barrow, and the barrow was extended to 16,5 m in diameter (see Olsen 1992 (this volume)).

POLLEN SAMPLES

Phase 1. Under the barrow was seen a 4–6 cm deep layer of brown humic sand with pebbles, covered by yellowish subsoil, which had been dug up during the construction of the urn grave. The humic sand constitutes an original surface horizon. The lower limit was sharp indicating a rendzina-like structure. Beneath the soil was seen yellowish sandy subsoil with pebbles. Samples from the surface horizon at 1 m north and 1 m south of the centre of the grave were analyzed (analyses nr. 1 and 2 in tables 1–2). In the fill were seen 6–8 cm thick horizontal layers of material similar to the surface horizon beneath the barrow. Samples from these layers, taken north and south of the grave, were analyzed too (analyses nr. 3 and 4).

Phase 2. Samples were collected in a vertical section in fill from phase 2 west of the stone cist. A humic sandy layer, 5 cm deep, constitutes an original surface horizon. Below was yellow stony sand and above the humic layer 43 cm fill. The fill consisted of yellow sandy clay with rust spots and contained horizontal layers of humic sandy clay. Hence, the fill deviates from the subsoil beneath the barrow, which did not contain clay. Samples from the original surface soil and at 14–19 cm above it were analyzed for pollen (analyses 5–6 in tables 1–2).

Phase 3. Samples were collected from humic layers in the fill, in a vertical section east of the stone cist (analysis nr. 7 in tables 1–2). Below the fill was seen disturbed material from phase 2.

POLLEN ANALYSIS

The samples used for pollen analysis were treated with potassium hydroxide, hydrofluoric acid, and acetolysis mixture, and were mounted in silicone oil. The pollen grains were strongly crumpled and the exines were often thinned (cp. Aaby 1983), whereas grains with corrosion scars were infrequent. These features made identification laborious, but it is unlikely that the original pollen composition was affected. The numbers of pollen grains counted vary 115–140 grains, per sample. The names of plant species in latin follow *Flora Europaea.*

GRASS POLLEN MEASUREMENTS

Diameter of the pore *annulus* in 175 measured grass pollen grains varied 3–7 μm, and no grains with average diameters above 33 μm occurred. It can be concluded that all of the grass pollen grains derive from wild grasses and that no cereal pollen is present (cp. Andersen 1979).

RESULTS OF THE POLLEN ANALYSES (TABLES 1–2)

Pollen sums and tree pollen numbers are shown in table 1. Average tree percentages were calculated for six samples, which appear uniform, whereas one sample (analysis nr. 4) was calculated separately. Non-tree pollen was calcu-

	phase 1				phase 2		phase 3		
Origin	sur-face	sur-face	fill	fill	sur-face	fill	fill		
Analysis, nr.	1	2	3	4	5	6	7	1–3 5–7	4
Pollen sum P	133	118	133	133	115	116	140	755	133
Tree-pollen sum AP	2	15	5	20	12	4	12	50	20
Trees % P	1,5	12,7	3,8	15,0	10,4	3,4	8,6	% of trees	
Lime, *Tilia cordata*	–	2	–	–	2	–	2	48,3	
Hazel, *Corylus avellana*	–	2	2	–	2	3	6	15,1	
Birch, *Betula*	1	5	2	15	2	–	2	12,1	75,0
Alder, *Alnus*	–	4	1	3	4	1	2	12,1	15,0
Oak, *Quercus*	1	1	–	2	1	–	–	3,0	10,0
Ash, *Fraxinus*	–	1	–	–	–	–	–	8,1	
Hornbeam, *Carpinus betulus*	–	–	–	1	–	–	–	1,3	
Deformed (birch)	–	–	1	5	–	–	–		

Table 1. Tree pollen in 7 samples from the Egshvile barrow. The tree pollen percentages were corrected according to Andersen (1970, 1980).

lated in percentages of non-tree pollen (table 2). Pollen from ligulate composites (Liguliflorae), which probably were buried in the soils by burrowing bees (cp. Andersen 1988), and fern spores, were calculated outside the pollen sums.

It is assumed that the pollen spectra from the surface soils beneath the barrows represent vegetation growing at the site at the time, when the barrows were erected, whereas the pollen spectra from the fill layers represent vegetation from sites around the barrow. The pollen grains are likely to derive mainly from vegetation growing near the sampling spots (inside tens of meters) and were buried in the soils within a short span of time (cp. Andersen 1988).

Trees. Tree pollen is very scarce in all the samples in table 1 (2–15% of the total pollen). It can be concluded that the samples derive from places devoid of trees. Lime (*Tilia cordata*) predominates in the average tree spectrum. Lime was scarce in regional tree vegetation in the Bronze Age (unpublished pollen diagram from central Thy). It is, therefore, not unlikely that this pollen was derived from former vegetation at the sites. The tree spectrum in analysis 4 is dominated by birch. Several of these pollen grains were deformed due to heating (cp. Andersen 1988). This sample comes from a site, where birch woodland had been burned at a former time.

Non-tree vegetation. The non-tree pollen taxa are grouped in plants from bare soil, dry-meadow plants, other herbs, shrubs, and plants from heaths and bogs, in table 2 (cp. Andersen 1988). The *Artemisia* pollen was rarely deformed, in contrast to the *Artemisia* pollen from Neolithic barrows in Denmark (Andersen, this volume and in print). Hence, there is no evidence that *Artemisia* had been present in burnt coppices, as in the Neolithic samples, and rather grew in vegetation in open areas. *Artemisia* (probably mostly mugwort, *A. vulgaris*) was therefore grouped with the plants from non-described open habitats (other herbs).

The non-tree pollen spectra from the soils in phase 1 (nr. 1–4 in table 2) are uniform, and so are the spectra from phases 2–3 (nr. 5–7). Hence, it is indicated that the samples from phases 1 and 2–3, respectively, derived from places with the same vegetation, and that the vegetation in phases 2–3 differed from that of phase 1. Average pollen spectra were, therefore, calculated separately for phase 1 and phases 2–3.

Plants characteristic of bare soil are scarce in all the pollen spectra. Solely sheep's sorrel (*Rumex acetosella*) occurs with a notable frequency in one sample, knot-grass (*Polygonum aviculare*) in one, and pollen from cereals are absent. It can be concluded that arable fields were not present near the sites.

	phase 1				phase 2		phase 3	phase 1	phase 2+3
Analysis, nr.	1	2	3	4	5	6	7	1–4	5–7
Non-tree pollen NAP	131	103	128	113	103	112	128	475	343
Bare soil, % NAP	–	8,7	0,8	–	1,0	1,8	1,6	2,1	1,4
Sheep's Sorrel, *Rumex acetosella*	–	8,7	0,8	–	1,0	–	0,8	2,1	0,6
Goose-foot Family, Chenopodiaceae	–	–	–	–	–	1,8	–	–	0,6
Knot-grass, *Polygonum aviculare*	–	–	–	–	–	–	0,8	–	0,3
Dry meadow	27,4	25,2	30,4	24,8	48,5	48,2	52,3	27,2	49,9
Ribwort, *Plantago lanceolata*	26,7	25,2	28,1	22,1	48,5	47,3	51,6	25,7	49,3
Adder's Tongue, *Ophioglossum*	0,8	–	0,8	0,9	–	–	0,9	0,6	0,3
Moonwort, *Botrychium*	–	–	1,6	–	–	0,9	–	0,2	0,3
White Clover, *Trifolium repens*	–	–	–	1,8	–	–	–	0,4	–
Other herbs	72,5	66,0	68,8	74,3	48,5	50,0	46,1	70,5	48,1
Wild grasses, Gramineae undiff.	66,4	58,3	55,7	58,4	40,8	39,3	43,0	59,6	41,1
Mugwort, *Artemisia*	3,1	1,0	7,0	7,1	1,9	3,6	0,8	4,6	2,0
Bedstraw, *Galium*-type	1,5	2,9	1,6	2,7	1,0	0,9	2,1	2,1	0,9
Buttercup, *Ranunculus*	0,8	–	3,1	2,7	3,9	4,4	1,6	1,7	3,2
Pink Family, Caryophyllaceae	0,8	2,9	0,8	1,8	–	–	–	1,4	–
Milfoil, *Achillea*-type	–	–	0,8	0,9	–	0,9	–	0,4	0,3
Ragwort, *Senecio*-type	–	1,0	0,8	–	–	–	–	0,4	–
Crucifer Family, Cruciferae	–	–	–	0,9	–	0,9	–	0,2	0,3
Pea Family, Fabaceae	–	–	–	–	1,0	–	–	–	0,3
Shrubs	–	–	–	–	1,0	–	–	–	0,3
Willow, *Salix*	–	–	–	–	1,0	–	–	–	0,3
Heaths and bogs	–	–	–	0,9	1,0	–	–	0,2	0,3
Heather, *Calluna*	–	–	–	0,9	–	–	–	0,2	–
Sphagnum	–	–	–	–	1,0	–	–	–	0,3
Ligulate Composites, Liguliflorae, % P	5,3	7,6	1,5	14,3	5,2	1,7	10,4		
Ferns, *Dryopteris*-type	1,5	–	0,8	–	3,4	2,6	1,7		

Table 2. Non-tree pollen in 7 soil samples from the Egshvile barrow, in percentages of non-tree pollen (NAP) and total pollen (P, Liguliflorae and ferns).

Among the dry-meadow plants, ribwort plantain (*Plantago lanceolata*) is common, but the ribwort pollen frequencies differ noticeably in the two average pollen spectra (26% in phase 1 and 49% in phases 2–3). Other dry-meadow plants are scarce in number and frequency.

The total of other herbs also differ in the two sample sets. Wild grasses are particularly frequent (60 and 41%). The other herbaceous plants are very scarce, and so are shrubs and plants from heaths and bogs.

The frequencies of the ligulate composites (Liguliflorae) differ widely in individual samples. Hence, there are distinctive traces of the activity of burrowing bees in some of the samples, but it is impossible to tell how much of this pollen derived from bee activity.

RECONSTRUCTION OF THE VEGETATION BENEATH AND AROUND THE BARROW

The barrow was erected in an intensively exploited country-side devoid of trees. In one case, from phase 1, the soil derived from a place where a birch coppice had been burned some time ago.

Arable fields were not present. Ribwort plantain and wild grasses are the main contributors to the pollen flora. The high frequencies of ribwort indicate widespread grazing by domesticated animals. These frequencies differ in samples from phase 1 and the phases 2 and 3. Ribwort is less frequent than wild grasses in the samples from phase 1 (26 and 60% respectively) and more frequent than the grasses in phases 2 and 3 (49 and 41%). Like other plants, ribwort is damaged by grazing (Groenmann van Waateringe 1986), however, ribwort survives grazing, as its leaf rosettes are close to the ground, and the plants keep producing new flower spikes throughout the summer, in contrast to the grasses, which are prevented from flowering by grazing. The high frequencies of ribwort pollen in the samples from the phases 2 and 3, therefore, indicate intensive grazing pressure, whereas grazing was less intensive in phase 1. This difference indicates an increase in exploitation from phase 1 to the phases 2 and 3. The scarcity of pollen from other herbaceous plants is probably due to the grazing.

The near absence of heath plants indicates that the soils in the area had not been leached in spite of the strong grazing.

The pollen spectra from the Egshvile barrow indicate vegetation cleared from trees and emphasize a great importance of cattle rearing in the early Bronze Age.

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