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ENVIRONMENTAL STUDIES AT THE KOHTLA-VANAKÜLA IRON AGE SACRIFICIAL SITE, NORTH-EAST ESTONIA

Kohtla-Vanaküla (Kohtla from here onwards) sacrificial site is an Iron Age weapons and tools deposit from the beginning of the Christian Era to around 800 AD (based on artefact chronology and AMS dates from the wooden handle remnants of the items' sockets and the charcoal pieces collected from the layer containing the finds). It is a significant discovery among its kind in Estonia and on a wider scale not only due to the number of items, but also because for the first time in Estonia it was possible to study the assemblage at least partially in its original state. Parallel to the archaeological excavations, different multidisciplinary studies were performed to determine the area's natural environment during the period when the items were deposited. The fieldwork was conducted in summer 2014. This article presents the results of geological, soil, micromorphological, archaeobotanical, and diatom studies.

Based on the retrieved data, it is not possible to completely reconstruct the natural environment of the sacrificial site for the period of use, but some pointers have been established. Presumably, the site was, at least during high water, a flooded meadow where water might have dwelt longer in ground concavities. One of the main factors favouring the wet conditions is impermeable thick argillaceous till that most likely prevented water from seeping into the ground. Moreover, the sacrificial site is located in a slightly concave topography and this also prevented the draining of the water even further in this specific spot. One can assume that the items were placed in a small marshy depression that was, at least part of the year, filled with water. The items were situated in a layer that indicates the formation of peat; this anoxic soil was the reason why the iron items were preserved.

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Introduction

In 2013, a weapons and tools deposit consisting of at least 400 individual objects was discovered on the territory of Luharahva farm in Kohtla, north-east Estonia (Figs 1 and 3). The rescue excavations took place in 2013 and were

Fig. 1. Kohtla Iron Age artefacts deposit in main excavation trench. A, B, C and D mark the arbitrary division of 1 sqm areas within the excavation trench, also referenced in Figs 5–6, northward up; photo by Jaana Ratas.

followed by further fieldwork in 2014. General artefact typochronology and AMS dates of the wooden handle remnants of the items' sockets and the charcoal pieces collected from the layer containing the finds indicate that items were deposited to the possible sacrificial site from the beginning of the Christian Era to ca 800 AD (Oras et al. 2018). Kohtla Iron Age sacrificial site is significant among its kind in Estonia and on a wider Circum-Baltic scale not only due to the number of items discovered, but also the chance to study the assemblage at least partially in its original location (Oras & Kriiska 2014).

The site is situated on a slanting farmland, typical to modern north-east Estonia, approximately 55–58 m a.s.l. Currently a meadow, but a few years ago it was an arable land actively in use (Figs 2 and 3). Already at the beginning of the research in 2013 it became clear that the modern landscape cannot be straightforwardly applied to the past. A quick look at the historical maps and at the toponym of the farm (*Luharahva* in English means Water meadow people) implied that the current landscape has formed recently. The natural environment of the area changed drastically during the last century; this includes the movement of the surface and groundwater (Arold 2005, 245). The locals remember the find site to have been a water-meadow that was often flooded. Local children had gone there skating in spring and autumn as recently as in the 1950s; the water disappeared after the oil shale mine was expanded (Kohtla oil shale mine was active in 1937–2001) and in the 1960s the former meadow became ploughland (pers. com. Tõnu Kiiver, a resident of Kohtla-Nõmme, 2014-7-22).

Most likely, an artificial drainage system was built also, and the former riverbed was levelled and deep ploughing was conducted (as indicated by the thick plough layer among other things). A small river near the find site, ca 100–200 m away, is depicted also on the historical maps, including a map from the 1940s; the now dry riverbed is barely visible on the Lidar elevation map

Fig. 2. Landscape around the sacrificial site of Kohtla, with Kohtla-Nõmme borough in the background; photo by Aivar Kriiska.

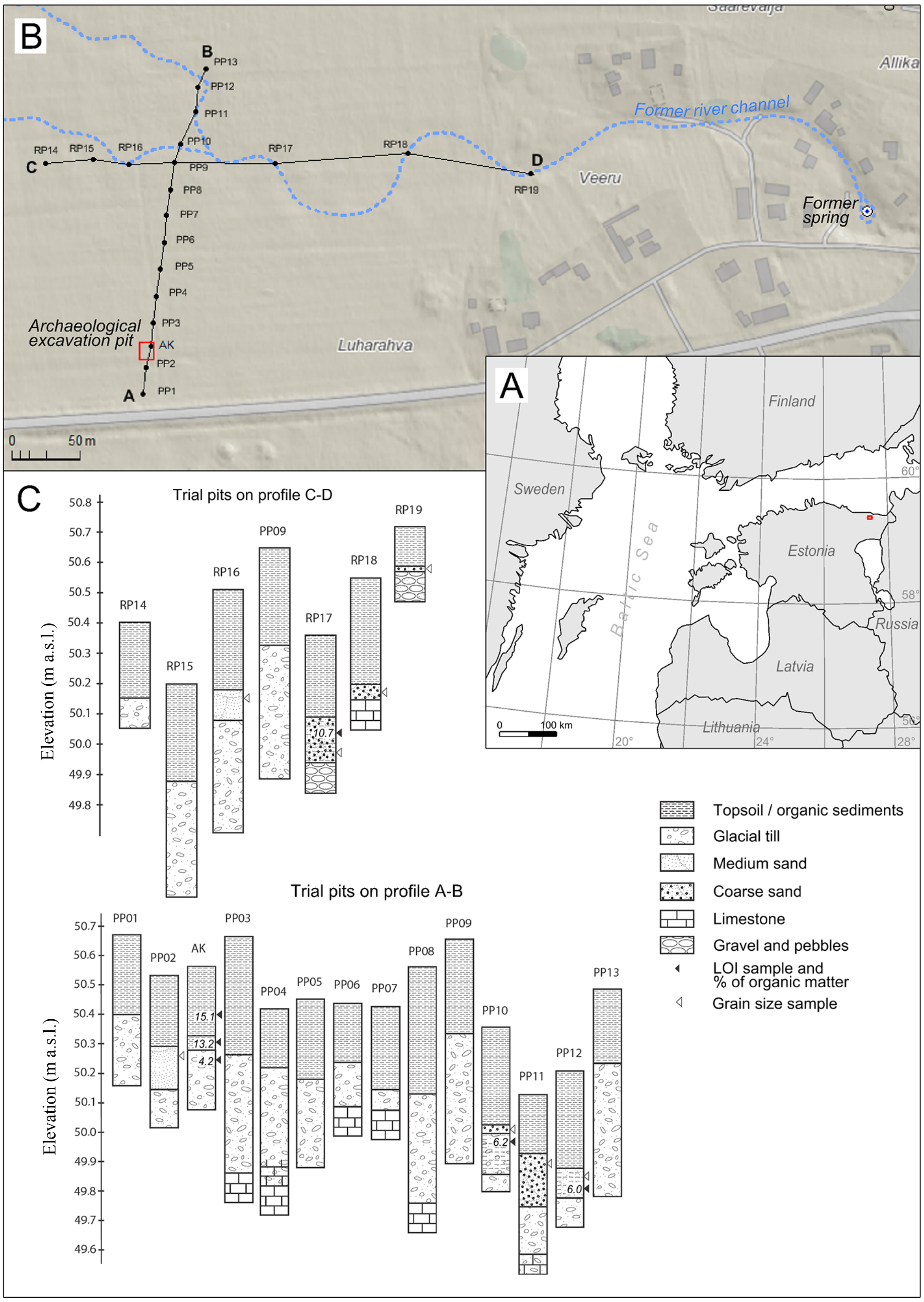

Fig. 3. A – an overview map of the study area, B – locations of geological trial pits (PP and RP) and profiles A–B and C–D. The dotted line marks the approximate location of the former river near Kohtla sacrificial site (a relief map from Estonian Land Board Map Server is used as background), C – stratigraphy of trial pits and the results of LOI; figure Triine Nirgi.

(Oras & Kriiska 2014, 62, figs 1 and 6; see also fig. 1: A in Oras et al. 2018). The spring from where the river once began can be seen on the modern landscape as a shallow pit between the village houses. This means that the current natural conditions of the find site can only be dated back a few decades and the upper part of the find assemblage has been destroyed only by recent farming.

Naturally this means that parallel to archaeological excavations, different scientific studies were performed to determine the area's natural environment during the period when the items were deposited. The field work was conducted in the summer 2014. In the following, we present the results of geological, soil, archaeobotanical and diatom studies.

Material and methods

To conduct geological studies, 19 trial pits forming two transects were dug, spanning 210 m (north-south transect) and 350 m (east-west transect). Based on the stratigraphy from pits, two geological profiles were created (A–B and C–D; Fig. 3). The strata of the trial pits (marked PP and RP on the Fig. 3) and main archaeological excavation trench (AK on the Fig. 3) were described and soil samples were collected. From the sediments of the excavation pit and trial pits samples were collected for loss on ignition (LOI) (Heiri et al. 2001) and from seven trial pits, where alluvial sediments occurred, for grain size analysis (Folk & Ward 1957; Blott & Pye 2001). After dry sieving, grain characteristics such as mean grain size and sorting were analysed using a computer program GRADISTAT.

To describe the soil, a full-scale soil test pit was dug on the site of the main excavation trench (Fig. 5), and also soil conditions in the trial pits around the soil pit were observed, and the profile was described. For laboratory analysis, soil samples were collected from the genetic soil horizons. The soil samples were air-dried and sifted through a 2-mm sieve. The acidity of the soil was measured in laboratory using a pH meter in a KCl water solution, mix ratio 1:2.5 KCl (1M). Soil texture was determined based on the USDA soil taxonomy (Soil Survey 1996). A prepared soil sample was weighed (5 g), suspended in 50 ml of the Mehlich 3 extractant, and for the filtered sample, the amounts of P, K, Ca, and Mg in the Mehlich 3 extractant were determined and analysed using the Agilent Technologies 4100 MP-AES. The results were calculated by the MP Expert (Microwave Plasma Instrument Software version 1.1.1.45895) software and then processed using MS Excel 2010. Corg, N was determined by dry ashing using the vario MAX CNS Element Analyzer (ELEMENTAR, Germany).

Two soil samples for archaeobotanical analysis were studied from black sandy silty clay with artefacts (Fig. 5). One of these was ca 0.5 litres in volume and the second one ca 0.1 litres. Samples were flotated with 0.4 mm mesh. All the flotated material was screened under a stereomicroscope.

Samples of sediment blocks were taken from the profile of the excavation trench in order to carry out soil micromorphology analysis (Fig. 4). Samples were

Fig. 4. Sampling with a sediment block from the profile of the excavation trench for soil micromorphology analysis; photo by Ester Oras.

obtained using a metal sampling block (instead of Kubiena tin, a simple quadrangular tin element used for wooden heated oven ventilation was utilized), which was pushed into the profile trench covering all the major visibly discerned layers. The block was removed, position marked on it, packed in cling-film and stored in a box. The analysis was carried out by the Stirling Analyses for GeoArchaeology, Biological & Environmental Sciences, University of Stirling. The sample block was dried with solvent exchange and impregnated with polyester (polylite) resin following standard procedures (http://www.thin.stir.ac.uk/). A ca 30 µm-thick covered thin section (dimensions: 5.5 × 7.5 cm) was manufactured from the hardened impregnated block. The thin section was studied under a polarizing microscope at magnifications ×12.5 to ×400, using plain polarized (PPL), cross-

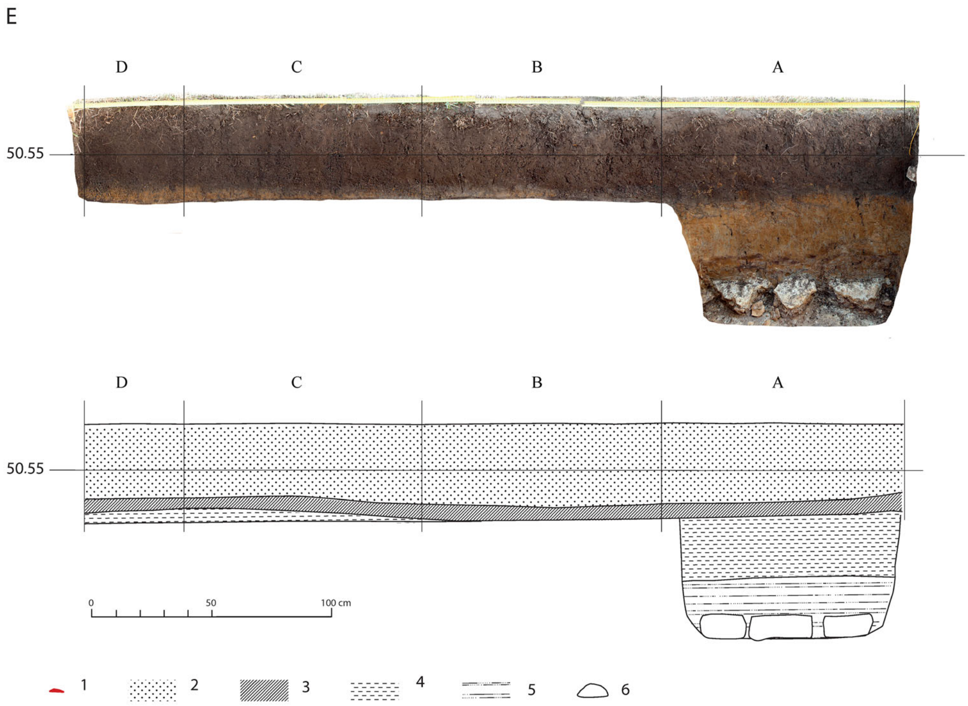

Fig. 5. Photo and drawing of the eastern profile of the main archaeological excavation trench. 1 – iron item, 2 – ploughing layer, 3 – black sandy silty clay with organic material, 4 – beige sandy silty clay, 5 – beige glacial till, 6 – limestones; photo and drawing by Jaana Ratas.

polarized (XPL) and oblique incident light (OIL). The relative abundance of sediment/soil components was estimated using standard semi-quantitative estimation charts (Kourampas 2016).

Two sub-samples were taken from artefact-rich deposit for diatom analysis. The samples were treated with 30% H_2O_2 to remove organic material followed by removing fine and coarse mineral particles by repeated decantation. A few drops of the remaining residue were dried onto coverslips and permanently mounted onto microscope slides, using Naphrax resin. Diatom valves were identified and counted under Zeiss Axio Imager A1 microscope at ×1000 magnification, using oil immersion and differential interference contrast optics. Diatoms were grouped into aquatic and aerial diatoms according to their ecology.

Results and discussion

Kohtla Iron Age sacrificial site is located on a bedrock of Ordovician limestones with thin layer of soil in Viru plateau (Arold 2005, 245). The trial pits indicated that on the sacrificial site and in nearby areas the limestone surface is lying approximately 1.5 m below the present-day ground surface. Beige coloured stony till covers the limestone. It is the glacier deposit of the Võrtsjärv sub-formation that comprises of loamy sand and sandy clay loam containing pebbles and cobbles (Estonian Land Board 2014. Map of Quaternary deposits). In some parts, there is a thin layer of sand covering the till. The topmost layer is mostly blackish grey, 16–40 cm thick humus-rich layer: humus horizon mixed by ploughing (Figs 3–6).

Lithostratigraphy indicates that the find site is located in a slightly concave topography (Fig. 3). Within its boundaries, between the till and topsoil, lies a thin (up to 10 cm) black organic-rich layer, that follows the shape of the depression and wedges out at the edges, in which the *in situ* archaeological items were located (Figs 5–6). According to soil micromorphology analysis this layer is organic-rich black sandy silty clay with remains of blue-green and probable green algae and moss, rare charcoal, hummified plant debris, and phytoliths (Kourampas 2016). Clayey sediment texture, organic content, abundance of likely filamentous blue-green and planktonic green algal remains (probably resulting from algal blooms on the water surface) and the presence of vivianite-group minerals, now oxidized, suggest that the artefact-encasing matrix was laid on the floor of a stagnant, anoxic water body, perhaps a fen, with seasonal algal blooms on its surface (Kourampas 2016, 8).

The soil samples taken from this layer contained charcoal, bones and fragments of iron. No charred plant remains were found. Samples contained single uncharred seeds of fat hen (*Chenopodium album*) and downy/silver birch (*Betula pendula/pubescens*). A selection of soil samples from the artefact layers were also analysed for chironomids giving negative results as well.

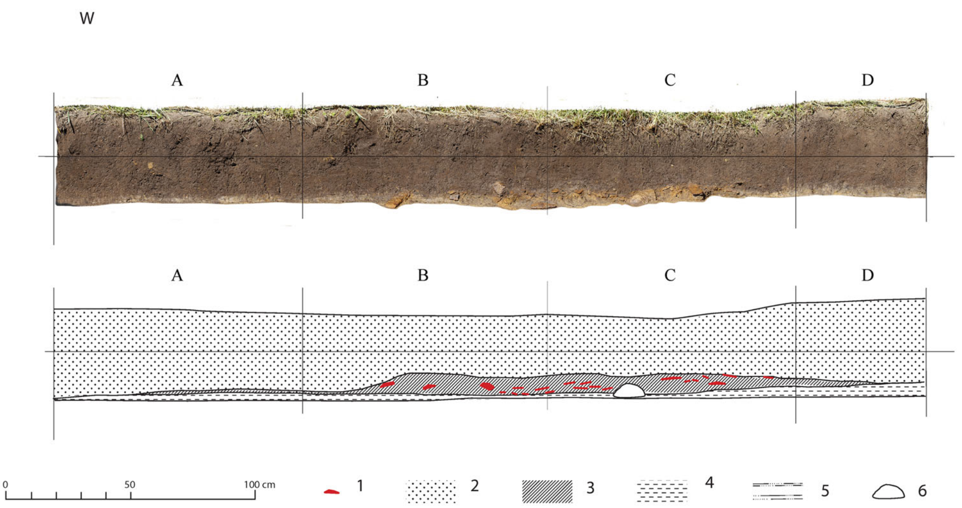

Fig. 6. Photo and drawing of the western wall of the main archaeological excavation trench. 1 – iron item, 2 – ploughing layer, 3 – black sandy silty clay with organic material, 4 – beige sandy silty clay, 5 – beige glacial till, 6 – limestones; photo and drawing by Jaana Ratas.

The interlayer between topsoil (ploughing layer) and black sandy silty clay is distinctly defined. The LOI analysis of the samples collected from the two layers of the excavation trench shows that the supramoraine darker layer contains a little less organic matter than the topsoil, respectively 13% and 15% (Figs 3: C, 4 and 5).

Charcoal found from the black sandy silty clay with artefacts indicates fire kept on the site or nearby the site. No waterlogged plant remains were discovered from this layer. The small number of fat hen and birch seeds must be considered recent intrusions. The lack of macrofossil plant remains do not rule out or indicate that the area could have been a wetland in the past. Plant remains could have been deposited on the site in the past. The site has however not been waterlogged continuously, which is required, for the preservation of uncharred plant remains in such an environment (Jacomet 2013). The possible plant remains would have been decomposed when various organisms could reach the dry and aeriated site. Similarly, the lack of chironomids does not necessarily mean missing wet condition: wet periods might have been just short or the subfossil remains might have been transported elsewhere postmortem or destroyed with later tillage activities.

The river that has been dried out and the riverbed later buried by the cultivation process, is still traceable in the ground relief and also in the sediments: sandy-gravelly riverbed sediments were present in several trial pits. In the bottom of the former river channel lies well rounded gravel (described in trial pits RP17 and RP19). Since the channel is eroded into glacial till, the gravel layer is probably a result of continuous washout of fines from the till deposit. The gravel is covered by interlayered poorly sorted beige sand with medium to coarse grain size (mean 349 µm), containing small grains of well rounded gravel. There were thin organic-rich layers in some trial pits indicating possibly a river bank or a flood plain (Fig. 3: C). As a result of land cultivation in the past decades the upper part of the river sediments has been supposedly destroyed.

In terms of pedology, it was possible to distinguish three soil horizons. A blackish grey distinctly formed humus horizon (A) was up to 35–40 cm thick and was partially mixed with the substance form the next horizon in its lower part. The humus horizon was succeeded by a distinctly formed approximately 30 cm thick yellowish brown metamorphic illuviated B horizon (cambic Bwl) with signs of gleying and with thin grey sandy layers and brown spots of rust. The parent rock (Cl) had been a gley horizon with rust-coloured patches. A quite similar situation was observable in all trial pits. Humus horizon was up to 40 cm thick in the area. Everywhere, the parent rock had been an argillaceous beige till, and in some parts of all of the described soil profiles sandy greyish interlayers were present within a soil profile. The content of organic substance in the studied humus horizon was 4.7–9.4 %. The soil samples have diverse texture, as both light and heavy textures are represented at the area (Table 1).

In sum the studies show that in the sacrificial site and in nearby area, Mollic Cambisols and Luvisols with both signs of gleying and gley horizon are the main soil types. The signs of gleying indicate that sporadically there has been short

Table 1. Textural content of the studied soil (location marker is the same as in Fig. 3). Capital letters: A – humus horizon, AH – transitional horizon from humus to peat, B – illuvial, E – elluvial horizon, C – parent material BC, EB – for horizons dominated by properties of one master horizon but having subordinate properties of another. Small letters: w – indication to development of colour or structure, or both, l – gleyic-capillary fringe mottling, indicates mottling caused by ascending groundwater. Fine-earth textures are according to WRB: HC – heavy clay, CL – clay loam, SiC – silty clay, SCL – sandy clay loam, L – loam, LS – loamy sand, S – sand

Location	Horizon	>0.063 (%)	<0.002 (%)	0.002–0.063 (%)	Soil texture
AK	A	41.7	25.8	32.5	L
AK	Bwl	53.9	19	27.1	SL
AK	Cl	12.6	14	73.4	HC
PP1	A	45.5	23.8	30.7	L
PP1	El	52.6	23	24.4	CL
PP1	Cl	9.1	40.7	50.3	SiC
PP2	A	53.9	20	26.2	SCL
PP2	E	88.8	4.3	6.9	LS
PP2	Cl	39.9	30.4	29.8	CL
PP3	A	39.5	19.7	40.8	L
PP3	B	83.3	7.6	9.1	LS
PP3	C	47.7	11.7	40.5	L
PP12	A	33.5	34.4	32.1	CL
PP12	BCl	56.5	15.8	27.7	SL
PP12	Cl	72.1	6	22	SL
RP14	AH	28.2	38.3	33.6	CL
RP14	Bl	30.4	36.9	32.6	CL
RP14	Cl	26.6	31.6	41.8	CL
RP18	AH	75.5	14.2	10.3	SL
RP18	C	94	1.7	4.4	S

term excessive moisture in the area that has resulted in a few gley patches or rust spots. Rust spots were present throughout of some parts of the profiles. The presence of gleysol indicates a continuous excessive moisture in the studied area. Since not all of the described soil profiles met the classification of gleysols, it is possible to argue that the soil moisture regime in the area has been varying. On the other hand, the raw humus horizon characteristic to waterlogged mineral soils was only present in some of the described soil profiles. Commonly, the soils in the area are rich by nutrients in humus horizon (A, Table 2), illuvial and elluvial horizons showing depletion trend. The nutrients tend to accumulate on lower horizons of parent material (C).

Relative species composition of diatom assemblages was difficult to obtain because diatom distribution was scarce and frustules were hard to detect. In addition, diatom valves were heavily fragmented. However, in one sample 39.3% of the assemblage consists of aerophilous diatoms, namely *Hantzchia amphioxys*, *Pinnularia borealis*, *Humidophila contenta* and *Luticola cohnii*. More common

Table 2. Chemical contents of the soil in the studied area (location marker is the same as in Fig. 3. Horizon explanations see Table 1)

Location	Horizon	P (mg/100 g)	K (mg/100 g)	Ca (%) (mg/100 g)	Mg (mg/100 g)	Fe (mg/100 g)	N (%)	C (%)
AK	A	3.1	6.6	454	35	27	0.6	6.3
AK	Bwl	0.2	4.3	211	14	10	0.0	0.9
AK	Cl	0.8	9.5	888	17	8.0	0.0	4.6
PP1	A	1.9	6.9	366	25.9	30.2	0.4	4.7
PP1	EBl	0.8	5.7	200	18.8	18.5	0	1.0
PP1	Cl	0.7	8.9	424	29.8	9.5	0.1	13.7
PP2	A	2.8	7.7	376	25.3	27.5	0.4	5.0
PP2	E	3.2	2.2	74	7.3	7.2	0	0.3
PP2	Cl	0.2	6.2	314	12.9	15.1	0	2.4
PP3	A	2.1	9.2	639	39.4	20.5	0.6	6.7
PP3	B	1.3	4.4	129	12.9	7.4	0	0.2
PP3	C	1.5	7.9	2416	22.5	0.5	0	10.2
PP12	A	1.0	6.9	448	23.1	23.1	0.5	5.8
PP12	BCl	0.0	3.8	182	11.3	7.6	0	0.3
PP12	Cl	0.0	1.9	81	8.5	13.4	0	0.2
RP14	AH	1.6	6.7	525	18.4	23.0	0.8	9.4
RP14	Bl	1.1	4.8	472	18.7	35.6	0.4	5.4
RP14	Cl	0.5	10.4	284	13.8	44.3	0	0.4
RP18	AH	2.4	11.8	433	25.1	29.3	0.6	7.1
RP18	C	2.6	3.3	379	9.4	9.6	0.1	2.4

aquatic diatoms observed were epipsammic *Fragilariforma neoproducta*. Some diatom species indicative of fluvial environment such as *Meridion circulare*, *Cocconeis pediculus*, *C. placentula* and *Planothidium lanceolate* were present in low relative abundance.

Aerophilous species that dominate in the diatom composition occur commonly in subaerial environments, i.e. on wet or moist or temporarily dry places and even can occur nearly exclusively outside water bodies (van Dam et al. 1994; Johansen 2010). Small-sized fragilarioid epipsammic diatoms growing attached on sand and silt grains are common in running water environment and might be indicative of fluvial activity. The assemblage of the diatoms suggests eu-terrestrial environment, possibly riverine wetland with temporarily inundated stream network and intermittent wetting and drying hydrological regime.

Conclusion

Kohtla Iron Age sacrificial site is currently located in the midst of dry grassland. However, this contemporary natural condition is recent development, and the landscape at Kohtla has been drastically changed due to different mining and land melioration activities. The results of our study show that the sacrificial site was initially located by a now dried-up river in a waterlogged area with a slightly concave topography. The area has been repeatedly flooded by the river and this has most likely caused the heterogeneous chemical composition of the soil. Flooding has caused the accumulation of sediments on river banks and to the areas affected by flooding, and this has resulted in material with varied composition. It is not possible to determine further details on the duration and range of the water flooding and probably the flooding has varied throughout the river's existence.

On the basis of the acquired data, it is not possible to completely reconstruct the natural environment of the sacrificial site for the period of use. On the other hand, there is no reason to doubt that the site was, at least during high water periods, a flooded meadow where water might have dwelt longer in ground concavities. This paleoenvironment is also evidenced by the results of micromorphological (blue-green and planktonic green algal remains and vivianite-group minerals), and diatom studies (aerophilous diatoms), both relating to the layer of black sandy silty clay in which the artefact deposit was discovered.

One of the factors favouring the wet conditions is impermeable thick argillaceous till deposit that prevents water from seeping into the ground. Since till lies on top of the limestone close to the ground, the ground water was near the surface already before the change in soil water retention. Presumably it supplied the spring from where the small river began. Since the river sediments are fairly thin, the river has been low-flowing throughout its existence. The area is level but the sacrificial site is located in a slightly concave depression and this prevented the drainage of water even further in this specific spot. One can assume that the items were placed in a small marshy depression that was, at least for part of the year, filled with water. The items were situated in a layer that indicates the formation of peat; this anoxic soil was the reason why the iron items were preserved.

Acknowledgements

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RAUAAEGSE OHVERDUSKOHA KESKKONNAUURINGUD KOHTLA-VANAKÜLAS, KIRDE-EESTI

Resümee

2013. aastal avastati Kirde-Eestist Kohtla-Vanakülast Luharahva talu maalt vähemalt 400 peamiselt raudesemest koosnev peitvara (jn 1). Kirveste ja odaotste putkedes säilinud puitvarrejäänustest ning leidudega kihist kogutud söetükikestest tehtud AMS-dateeringud osutavad, et sinna, arvatavasse ohverduspaika, asetati esemeid tõenäoliselt korduvalt alates ajaarvamise vahetusest kuni umbes 800. aastani. Kohtla ohverduskoht on nii Eesti kui ka laiemas mõõtkavas tähendusrikas mitte ainult leitud esemete rohkuse, vaid ka osaliselt säilinud leiusituatsiooni poolest.

Ohverduskoht paikneb tänapäeval laugel heinamaal, mis veel mõni aasta tagasi oli kasutusel küntava põlluna (jn 2). Juba uuringute algul sai selgeks, et praegust olukorda ei saa automaatselt minevikku kanda, sellele osutasid nii ajaloolised kaardid (kus on kujutatud leiukoha läheduses väike jõgi) kui ka talu nimi Luharahva. Kohalike elanike mälestustes oli leiukoht kunagi jõeäärne luht, mis oli sageli üleujutatud, põld olevat sinna rajatud alles 1960. aastatel, mil põlevkivikaevandamise tulemusel muutus veerežiim ja jõgi kuivas.

Paralleelselt arheoloogiliste väljakaevamistega tehti 2014. aastal loodusteaduslikke uuringuid eesmärgiga selgitada esemete deponeerimse aegset looduskeskkonda. Leiukoha ümbrusse rajati põhja-lõuna suunas umbes 210 m pikkusele profiilile ja ida-lääne suunas umbes 350 m pikkusele profiilile kokku 19 kaevet (A–B ja C–D; jn 3). Nii nende kui ka arheoloogilise peakaevandi pinnasekihid kirjeldati ja võeti pinnaseproovid (jn 4). Kaevandite orgaanikarikkamatest setetest tehti kuumutuskaoanalüüs ja seitsme prooviaugu setetest lõimiseanalüüs. Muldkatte kirjeldamiseks tehti sügavkaeve peakaevandi kohal (jn 5), vaadeldi mullastikulisi tingimusi kaeve ümber asetsevates proovikaevandites ja kirjeldati mullaprofiili eelmainitud kaevistes. Laboratoorseteks analüüsideks võeti mullaproovid erinevatest mulla geneetilistest horisontidest. Arheoloogilise kaevandi leidudega kihist võetud pinnaseproovidest tehti ka mikromorfoloogilised, arheobotaanilised, surusääskede ja ränivetikate analüüsid.

Kohtla-Vanaküla ohverduskoht asub õhukese pinnakattega kaetud Ordoviitsiumi karbonaatkivimite avamusalal Viru lavamaal. Prooviaugud osutasid, et ohverduskohal ja selle lähiümbruses paikneb paekivi pealispind keskmiselt umbes 1,5 m sügavusel tänapäevasest maapinnast (jn 3: C). Paekivi peal lasub beež moreen, Võrtsjärve alamkihistu liustikusete, mis koosneb saviliivast ja liivsavist, veeristest ning munakatest. Paiguti esineb moreeni peal ka liivakihte. Pealmiseks kihiks on enamasti mustjashall 16–40 cm paksune huumusrikas künnikiht. Geoloogilised profiilid osutavad, et leiuala paikneb praeguseks kuivanud jõe sängi (eristatav setetes) lähedal asetsevas lohus (jn 3: C) ja selle piires paikneb moreeni ja künnikihi vahel kuni 10 cm paksune lohu kuju järgiv ning servades väljakiilduv musta värvi orgaanikarikas kiht, milles asetsesid arheoloogilised esemeleiud (jn 5 ja 6). Kahe kihi kontakt on teravapiiriline. Kaevandi alalt võetud nende kahe kihi proovide kuumutuskaoanalüüs näitas, et moreenipealne tumedam kiht on pisut orgaanikavaesem kui künnikiht (jn 3: C).

Mullateaduslikud uuringud osutavad, et ohverduskohal ja selle vahetus ümbruses esinevad valdavalt leostunud ning leetjad mullad, mis olid nii gleistumistunnustega kui ka glei horisondiga. Gleistumistunnused näitavad, et antud alal on esinenud kohatist lühiajalist liigniiskust, mille käigus on tekkinud üksikud gleilaigud või roostetäpid. Gleimuldade esinemine viitab alalisele liigniiskusele uurimisalal.

Ohverduskoha kasutamise aegset loodussituatsiooni rauaajal ei ole võimalik saadud andmete alusel täielikult rekonstrueerida. Tõenäoliselt oli see toona vähemalt kõrgvete ajal üleujutatav luht, kus lohkudesse võis vesi jääda ka pikemateks perioodideks. Sellisele paleokeskkonnale osutavad nii arheoloogiliste leidudega kihist tehtud mikromorfoloogilised kui ka ränivetikate analüüsid.

Üheks peamiseks niiskeid olusid soodustavaks teguriks seal oli tihe savikas moreen, mis ei lasknud tõenäoliselt vett läbi, takistades selle maasse imbumist. Kuna ohverduskoht asetses väikeses madalas nõgusas pinnavormis, oli tõenäoliselt sellel konkreetsel kohal liigse vee äravool veelgi enam raskendatud. Nii võib oletada, et esemed asetati väikesesse soisesse lohku, mis oli vähemalt osa aastast veega täidetud. Leiud paiknesid kihis, mis osutab, et seal on toimunud turbateke ja see anoksiline pinnas on ka põhjuseks, miks raudesemed säilisid.