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Zooarchaeological evidence for the exploitation of birds in medieval and early modern Estonia (ca 1200–1800)

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ABSTRACT

In this paper, we discuss bird bones from sixteen sites across Estonia, focusing on the Medieval and Early Modern Period (ca 1200–1800). Zooarchaeology, stable isotope analysis and Zooarchaeology by Mass Spectometry (ZooMS) are used to explore how the exploitation of birds has differed between sites of various functions and locations. The results demonstrate the ubiquity of the chicken as the most abundant avian species in most sites and periods under study. The goose and the duck were the second and third most common species identified in the assemblages. Species diversity was highest at castle sites, where the presence of different wild birds can be associated with higher social status; however, the use of several bird species is unlikely to be food-related. The most frequently discovered wild birds were the black grouse and the western capercaillie, which are also known to have been served at feasts. This paper presents the first comprehensive study of Estonian avian zooarchaeological material from various contexts, giving a better overview of the importance of birds to historical communities.

KEYWORDS

zooarchaeology, birds, Medieval Period, Early Modern Period, Estonia.

Introduction

The investigation of bird bones from medieval and early modern Estonia has intensified in recent years. Several studies have taken place within the project *Foreign vs local in Medieval and Modern Age foodways in the eastern Baltic: tracing the changing food consumption through provenance analyses* (2018–2022;

PRG29). However, most of these studies focus on a specific site or area (e.g. Lõugas et al. 2019; Ehrlich et al. 2022b; Haak et al. 2022). This paper summarizes the results of the project and discusses avian remains from different sites across Estonia (ca 1200–1800), including castles, towns, and medieval and early modern rural sites (Fig. 1). The primary aim is to explore how the exploitation of birds has changed among sites of various functions and locations but, where possible, the origin of the birds (e.g. local or foreign) will also be discussed.

For the PRG29 project, a sample was drawn from previously excavated sites, with the aim of discussing food-related issues in urban (both *intra* and *extra muros*; the latter is synonymous with suburbs) and rural contexts. Several castles in medieval Livonia were located near towns and the material culture of castles resembles that of urban centres, often being even more diverse (e.g. Russow et al. 2006). In terms of the amount of collected bird bones, the castle material clearly exceeds that from villages (Lohkva and Sargvere), making comparisons difficult. As most hilltop sites have an earlier dating, only Pöide has been included in this study. Despite the small sample size, the Pöide hilltop site in Saaremaa (ca 600–1300, i.e. the Iron Age and the beginning of the Medieval Period) gives more insight into wider geographical and chronological trends, as it is the only island site included.

As mentioned above, the majority of avian zooarchaeological material originates from castle contexts (particularly Viljandi, Karksi and Vastseliina), with a sizeable collection of bird bones also identified at urban sites such as Tartu and Tallinn. To generalize, urban sites likely reflect the consumption of the average population,

FIG. 1. Archaeological sites included in this study. Black symbols represent castle sites, grey symbols urban and suburban sites, white symbols rural sites, black-and-white symbols hilltop sites.

whereas castles can be considered 'top predator' sites (see also Ervynck 1992), with Viljandi Castle, for example, being the residence of one of the Commanders of the Livonian branch of the Teutonic Order. To facilitate data analysis, all sites have been divided into broad temporal categories: Late Iron Age (in Estonia, ca 800–1220), the Medieval Period (ca 1220–1558) and the Early Modern Period (1558–1710). This study compares the abundance of avian species across the mentioned temporal, spatial and social groupings to identify general patterns of bird breeding and exploitation in medieval and early modern Estonia.

Material and methods

COLLECTION AND SAMPLING

Specifically for this article, bird bones from sixteen excavations at twelve sites[1] were analysed or re-examined (Table 1), while the discussion part includes previously published material (Ehrlich et al. 2022b) not listed in Tables 1 and 2. The study material originates from sites with very different excavation techniques, and this is also reflected in the remarkably uneven number of collected bird bones (from 11 to 2158 remains). Unfavourable excavation conditions and an inexperienced workforce were at least partly at fault for the unexpectedly small amount of bird bones (2.6% of all identified bones) that were recovered from Põhja Street in Pärnu, whereas careful hand picking and sieving resulted in a significantly enhanced outcome at Viljandi Castle (11.7%) and cesspits in Tartu (between 6.6% and 32%, depending on the site) (Ehrlich 2022; Ehrlich et al. 2021; Rannamäe et al. in prep. a–b). Rural sites, however, have produced substantially fewer bird bones, despite partial sieving (Saage et al. 2021; Rannamäe & Ehrlich 2023).

ZOOARCHAEOLOGY

A total of 4725 bird bones collected from twelve sites (Table 2) were identified, using well-established methods of zooarchaeology. The identifications were based on morphology, using the reference collections of the Department of Archaeology and the Natural History Museum at the University of Tartu, the Archaeological Research Collection at Tallinn University, and the Institute of Systematics and Evolution of Animals at the Polish Academy of Sciences in Kraków, Poland. The bones are stored in the archaeological collections of the Archaeological Research Collection at Tallinn University and the Department of Archaeology at the University of Tartu. All the sites mentioned in Table 2 were newly studied for this paper, with the exception of Karksi and Pöide which were re-identified for this analysis.

In most cases, goose bones were identified as *Anser*/*Branta* and duck bones as Anatinae. Both groups potentially include wild and domestic specimens. The age of the specimen was determined by porosity and fusion, and classified as juvenile,

1 The two excavations in Tallinn suburbs and four in Tartu town area have been combined in further analysis and in Table 2.

TABLE 1. Sites from which bird remains were identified for this study

Site	No.	Location and year	Collection ID	Site type	Time period	No. of bird bones	Collection method	Analyst of bird bones
Otepää	1	Castle (1955)	AI 4036	Castle	MA	118	Hand-picked	F. Ehrlich
Tallinn	2	Estonia pst 7 (2019)	AI 8013	Suburb	MA/EMP	71	Hand-picked + wet sieved sample	S. Nuut, F. Ehrlich
	3	Tatari 1 (2020–2021)	AI 8352	Suburb	EMP	23	Hand-picked	F. Ehrlich
Põide	4	1990–1993	AI-SM-9946	Hilltop site	IA	108	Hand-picked	L. Lõugas, F. Ehrlich
Haapsalu	5	Castle (2017)	HM 9206:1/AI-0004	Castle (lavatory)	EMP	283	Hand-picked + wet sieved sample	F. Ehrlich
Pärnu	6	Põhja Street (2002)	PäMu A 2570	Town	MA/EMP	17	Hand-picked	F. Ehrlich, T. Tomek
Tartu	7	University of Tartu Botanical Garden (1989)	TM A 43	Town	MA	17	Hand-picked	F. Ehrlich
	8	Ülikooli 15 (2005, 2007)	TM A 141	Town (incl. cesspits)	MA	187	Hand-picked	F. Ehrlich
	9	Küütri 1 (2006)	TM A 162	Town (incl. cesspit)	MA	427	Hand-picked	F. Ehrlich
	10	Lutsu 12 (2016)	TM A 244	Town (incl. cesspit)	MA	59	Hand-picked	E. Rannamäe, F. Ehrlich, T. Tomek
Põltsamaa	11	Castle (1998)	TÜ 714	Castle	MA/EMP	72	Hand-picked	T. Tomek, E. Rannamäe, S. Nuut; F. Ehrlich
Vastseliina	12	Castle (2005)	TÜ 1435	Castle	EMP	1067	Sieved	F. Ehrlich, T. Tomek
Sargvere	13	Settlement (2007)	TÜ 1574	Settlement site	MA	36	Hand-picked	E. Rannamäe, F. Ehrlich
Karksi	14	Castle (2011–2012)	TÜ 1929	Castle	MA	2158	Sieved	E. Rannamäe, T. Tomek, F. Ehrlich
Lohkva	15	Settlement (2012)	TÜ 2004	Settlement site	MA/EMP	11	Hand-picked	E. Rannamäe, F. Ehrlich
Viljandi	16	Castle (2006)	VM 11167	Castle	EMP	92	Partial sieving	F. Ehrlich

MA – Middle Ages, EMP – Early Modern Period

subadult or adult. Taphonomic changes (cut marks, gnaw marks, and burn marks) were also recorded. The species for six eggshell fragments from three excavations in Tartu[2] (Table 1: 8–10) were determined using collagen peptide mass fingerprinting – Zooarchaeology by Mass Spectrometry (ZooMS) (Buckley et al. 2009). The work was conducted at BioArCh, Department of Archaeology, University of York (United Kingdom), following a method by Presslee et al. (2018). The faunal remains were recorded in the ARHIS database after Lõugas (2018). The open access data are available online in the metasearch engine of Estonian archaeology, ARHEST.

STABLE ISOTOPE ANALYSIS

Stable isotope analysis is a quantitative method for reconstructing palaeodietary and -ecological patterns at an individual level (Schoeninger & Moore 1992; Sealy 2001). Domestic birds are rarely analyzed in archaeological palaeodietary studies, typically due to their small importance in human diets compared to other livestock, but also because of the underrepresentation of bird bones in zooarchaeological assemblages. However, stable isotope analyses can offer novel insights into the ecology, migration and feeding habits of avian fauna (e.g. Inger et al. 2006), providing another line of evidence for the study of bird exploitation in the past.

For the period under study, isotope data for the chicken is available in Aguraiuja-Lätti et al. (2022) (n = 7) and Malve et al. (2023) (n = 7). These are mostly medieval specimens from urban sites in southern (inland) Estonia (Tartu, Viljandi), while early modern samples are from rural Lohkva and the coastal town of Pärnu. Ehrlich et al. (2022a) also has information about 23 analysed goose bones ($\delta^{13}C$ and $\delta^{15}N$ values), with their respective sulphur isotopic values published in Aguraiuja-Lätti et al. (2022). The goose bones are from various contexts across the study area, ranging from the Late Iron Age up until the Early Modern Period. For details about the methodology and analytical supporting information, see the respective publications.

Results and discussion

AVIAN ZOOARCHAEOLOGICAL ASSEMBLAGES BY CONTEXT AND REGION

The material discussed in this paper can be divided into five site types – hilltop sites, castles, towns, suburbs, and settlement sites. The main difference between avian bone assemblages from these site types lies in the abundance of species. A long list of species can also be seen as a sign of higher status (Sykes 2004). In general, the number of species in the zooarchaeological material from castles (Otepää, Haapsalu, Põltsamaa, Vastseliina, Karksi, Viljandi) is much larger compared to towns and suburbs, while at the settlement sites of Lohkva and Sargvere, species

2 Sampling permissions given by the holding institution as stated in the sampling protocol TÜ PP No. 110 (Department of Archaeology at the University of Tartu) and PP No. TM-07 (Tartu City Museum).

TABLE 2. Bird taxa from the sites analysed for this study

Taxon		Hilltop site	Castle						Town		Suburb	Settlement site		
Order	Species	Põide (IA)	Karksi (MA/EMP)	Otepää (MA)	Põltsamaa (MA)	Vastseliina (EMP)	Viljandi (EMP)	Haapsalu (EMP)	Tartu (MA)	Pärnu (MA/EMP)	Tallinn (MA/EMP)	Sargvere (MA)	Lohkva (MA/EMP)	Total
Anseriforms	Greater white-fronted goose (*Anser albifrons*)				1									1
	Goose (*Anser*/*Branta*)	8	30	11	6	32	9	84	12	6	21			219
	Swan (*Cygnus* sp.)						1							1
	Garganey (*Spatula querquedula*)									1				1
	Eurasian wigeon (*Mareca penelope*)								1					1
	Mallard (*Anas platyrhynchos*)				1	7		4	2					14
	Common teal (*Anas crecca*)					1								1
	Garganey/common teal (*Spatula querquedula*/*Anas crecca*)					3								3
	Long-tailed duck (*Clangula hyemalis*)					1								1
	Duck (Anatinae)	27	1	6	1	5	3		1		2			46
	Unidentified anseriforms		3			4	1							8
Galliforms	Domestic chicken (*Gallus gallus domesticus*)	40	852	72	20	286	23	88	256	4	32	5	9	1687
	Turkey (*Meleagris gallopavo*)							3			1			4
	Hazel grouse (*Tetrastes bonasia*)		16			4	5							25
	Western capercaillie (*Tetrao urogallus*)		2	2	1	7		2	1	1	1			17
	Black grouse (*Lyrurus tetrix*)		6	7	10	38	4	3	4		2	11		85
	Western capercaillie/black grouse (*Tetrao urogallus*/*Lyrurus tetrix*)	1	4	1	1	16	1	10			1	2		37
	Grey partridge (*Perdix perdix*)				1	6								7
	Unidentified galliforms	5	668	12	8	128	14	43	180		6	13	1	1078

Continued on the next page

TABLE 2. *Continued*

Apodiforms	Common swift (*Apus apus*)					1								1
Columbiforms	Rock dove/domestic dove (*Columba livia/Columba livia domestica*)				1	1								2
	Common woodpigeon (*Columba palumbus*)					1								1
	Rock dove/common woodpigeon (*Columba livia/palumbus*)					4								4
	Columbidae					2		2						4
Gruiforms	Eurasian crane (*Grus grus*)			1		1								2
	Crane (*Grus* sp.)					1								1
Charadriiforms	Eurasian woodcock (*Scolopax rusticola*)					3								3
	Unidentified charadriiforms								6		1			7
Accipitriforms	Osprey (*Pandion haliaetus*)					1								1
	Lesser spotted eagle/greater spotted eagle (*Clanga pomarina/clanga*)					3								3
	Western marsh-harrier (*Circus aeruginosus*)					1								1
Piciforms	Great spotted woodpecker (*Dendrocopos major*)					2								2
	Black woodpecker (*Dryocopus martius*)					1								1
Passeriforms	Eurasian magpie (*Pica pica*)				1	4			1					6
	Eurasian jackdaw (*Coloeus monedula*)					10	7	5	6					28
	Carrion crow (*Corvus corone*)					1								1
	Crow (*Corvus corone/cornix*)	2				1								3
	Common raven (*Corvus corax*)			3	1									4
	Corvids				1	4	3	1	5					14
Unidentified birds		25	576	8	18	457	21	41	218	3	27	5	1	1400
Total		108	2158	123	72	1037	92	286	693	15	94	36	11	4725

IA – Iron Age, MA – Middle Ages, EMP – Early Modern Period

diversity is the lowest. Wild birds are completely absent from Lohkva, whereas the Sargvere assemblage includes some wild galliforms. It thus seems that castles and towns were characterized by more intense practices of bird breeding and their utilization in comparison with rural areas.

Also, numerically, the largest assemblages included in this study originate from castles. In all the studied castles, the most abundant bird is the chicken. While earlier studies have shown the presence of around 30 species at Viljandi Castle (Ehrlich et al. 2022b), over 20 species were identified at Vastseliina, 7 species in medieval and early modern Põltsamaa, medieval Otepää and early modern Haapsalu, and 6 species at Karksi Castle. In the latter case, the total number of bird bones is remarkably smaller. While there seems to be a trend toward a larger variety of species from the 15th century onwards, the differences in the number of species represented can also be caused by the unequal status of the castles. For example, Viljandi was one of the most important and largest castles in Livonia, which may explain its high species diversity. In addition, there are some species so far only recovered from castle contexts. Special note should be made of raven bones (*Corvus corax*) from Otepää and Põltsamaa, as all four are wing bones, while earlier material includes several bones presumably from one individual (Ehrlich et al. 2022b, table 2). In the Nordic countries, corvids are usually considered scavengers and eaten only in extreme circumstances (e.g. Haley-Halinski 2021, 157–161). Thus, these finds are almost certainly not related to food.

There are significant differences between the urban centres included in the study. Tallinn and Pärnu border the Baltic Sea, while Tartu is a typical inland town. Moreover, the bird bones from Tallinn originate almost exclusively from two suburban sites, whereas the plots in Tartu give a good overview of different locations inside the walled town inhabited by people of varied social status. The zooarchaeological material from Tallinn and Tartu is, nevertheless, quite similar. Both have a similar level of species diversity, with the chicken being the most common bird. The second most abundant fowl is the goose, followed by the duck, wild galliforms, and corvids. On the other hand, in Pärnu, most of the bones belonged to geese, with other species represented only by a few bones. This might be influenced by the excavation method because the sample size for Pärnu is small and the percentage of large birds is unusually great. However, at other coastal sites – Haapsalu and Pöide – the proportion of waterfowl is also high.

The very low number of bird bones from rural sites contrasts with the evidence from written sources, indicating the presence of chickens, geese, and ducks, and that several manors demanded taxes in chickens and eggs (Ligi 1968, 78–82; 1992, 155). It would thus seem that bird bones are underrepresented in the zooarchaeological collection, which may result from unelaborate excavation practices at medieval rural sites, where both artefacts and ecofacts were hand-picked. In addition, butchery remains could have been offered to domestic omnivores such as cats and dogs, resulting in a considerable loss of avian zooarchaeological material.

The main difference between coastal and inland sites seems to be the percentage of waterbirds. At the Iron Age Pöide hilltop site, 25% of the collected bird bones belonged to ducks. The coastal location of Pöide on the island of Saaremaa would certainly have provided easy access to wild waterbirds. Only a few duck bones are usually present at other sites, comprising around 0.5–5% of all bird bones, thus making the Pöide assemblage especially outstanding. For example, at the Late Iron Age settlement site in Viljandi, only four duck bones were present among 1276 bones (Ehrlich et al. 2022b). In addition to ducks from Pöide, the early modern Haapsalu Castle (another coastal site) had an unusually high proportion of goose bones (29.7%, second only to the chicken). The high percentage of ducks from Pöide and geese from Haapsalu may suggest that the bones belonged to wild rather than domestic specimens because of the proximity of the coastline. Previous studies on avian remains from Tallinn (e.g. Tomek 2012; 2019) have also demonstrated a remarkably high proportion of geese in the assemblage (24–31%), while at inland sites, the proportion is usually between 2–9%, being the lowest at Karksi and the highest in Otepää.

UTILIZATION OF DOMESTIC BIRDS

Birds have been used for different purposes in the past, the main emphasis being on their nutritional value. In general, the chicken (*Gallus gallus domesticus*) is the most abundant species at medieval and early modern sites in the wider eastern Baltic region (e.g. Ehrlich et al. 2022b; Lõugas et al. 2019; Rumbutis et al. 2018). Our study reached the same conclusion, with the exception of the small samples from the Sargvere settlement site and Pärnu town.

Males were identified by the presence of a spur. The percentage of chickens with spurs or spur scars is generally between 1–7%. Based on the presence of the medullary bone, around 1–2% of the chicken bones were identified as female. Neither proportion seems to be dependent on the time period or site type. The latter percentage was similar in medieval and early modern Viljandi (Ehrlich et al. 2022b), while it appears larger in Põltsamaa (5%) and Lohkva (22.2%); however, only one and two medullary bones, respectively, are present in these very small samples.

Juveniles formed 4–42% of the chicken bone assemblage, reflecting the importance of chicken meat consumption. Karksi seems to stand out with a very low proportion of juveniles (4%) compared to other, both medieval and early modern castles (11–22%). At the medieval Viljandi Castle, around a third of the bones belonged to juveniles, and the preference for the meat of young chickens has been noted in several castles of the Teutonic Order (Ehrlich et al. 2022b, 102–103). Juveniles could also be distinguished in the material from the Sargvere settlement site (n = 2) and from the suburbs of early modern Tallinn (n = 5). In medieval Tartu, juveniles formed 9% of the material, but the bones were found in cesspits; therefore, the find context differs from others as well as between individual cesspits. The importance of chicken meat consumption is also indicated by cut marks, which could be traced on 1–26% of the bones.

In addition to meat, eggs were also routinely consumed, but egg remains are rarely recovered from archaeological contexts. One such occasion is the discovery of at least seven eggshell fragments in the medieval cesspits in Tartu (Haak et al. 2022, 44). Six of those were analysed by ZooMS, and the results showed that all of them belonged to *Gallus gallus* (either the red junglefowl or the domestic chicken) (Table 3). As the red junglefowl is not found in the area, the eggs can be confidently assigned to the domestic chicken.

TABLE 3. ZooMS results (*m/z*) for six sampled eggshells (Est-14, Est-15, Est-16, Est-17, Est-18, Est-19) found in Tartu. According to 16 unique Gallus markers, as defined in Presslee et al. 2018, all six samples are *Gallus gallus*. Table made by Eve Rannamäe

Peptide sequence	Protein	Est-14	Est-15	Est-16	Est-17	Est-18	Est-19
R.FASWHR.T	ovocleidin-17	803.4	–	–	803.4	–	–
R.VASMASEK.M	ovalbumin	822.4	–	–	822.4	–	–
R.TPPFGGFR.E	clusterin	878.4	878.4	878.4	878.4	878.4	878.4
R.VQQEVAPAR.G	ovocleidin-116	997.6	–	997.6	997.6	997.6	–
R.EAFVPPVQR.V	clusterin	1042.6	1042.6	1042.6	1042.6	1042.6	1042.6
P.TPGGCLGFFSR.E	ovocleidin-17	–	–	–	–	–	–
R.ARVQQEVAPAR.G	ovocleidin-116	–	–	–	1224.7	–	–
R.GVVGGMVVPEGHR.A	ovocleidin-116	–	–	1293.7	1293.7	–	–
R.GSTVAGGFAHLHR.G	ovocleidin-116	1309.7	1309.7	1309.7	1309.7	1309.7	1309.7
R.VWIGLHRPAGSR.S	ovocleidin-17	1348.8	1348.8	1348.8	1348.8	1348.8	–
R.VWPGAAPAPGVVGVAR.P	ovocleidin-116	1503.9	–	1503.9	1503.9	1503.9	–
R.VWPGAAPAPGVVGVAR.P	ovocleidin-116	1519.9	1519.9	1519.9	1519.9	1519.9	1519.9
R.LGQAARPEVAPAPSTGGR.I	ovocleidin-116	1734.9	1734.9	1734.9	1734.9	1734.9	1734.9
R.VWPGAAPAPGVVGVARPAPSK.A	ovocleidin-116	–	–	–	–	–	–
G.DPDGCGPGWVPTPGGCLGFFSR.E	ovocleidin-17	2336.0	–	2336.0	2336.0	–	–
K.EDVHVDTEGIDEFAYIPDVDAVTITR.G	ovocleidin-116	–	–	–	2919.3	2919.3	–

The goose (*Anser*/*Branta*) was usually the second most numerous bird species among most of the sites included in this study. Of all the identified bones, only five belonged to juvenile geese (one at Vastseliina and four in Tartu). This may suggest that geese were primarily kept for secondary products such as eggs and feathers, or that the birds were slaughtered only on special occasions (Gál 2006). Both seem to be possible explanations. For example, in medieval Estonia, geese were traditionally eaten at feasts during the fall (Põltsam-Jürjo 2013, 125, 128). Goose meat consumption is also indicated by the presence of several cut marks on bones rich in meat (e.g. humerus, tibiotarsus). In addition, geese were an important source of fat.

STABLE ISOTOPE EVIDENCE

Stable isotope analyses on chicken bones from the study region have revealed similarities between the diets of chickens and those of other domestic omnivores

such as pigs (Fig. 2; see also Aguraiuja-Lätti et al. 2022; Malve et al. 2023). As with pigs (Rannamäe & Aguraiuja-Lätti, this issue), chickens were likely fed a combination of cultivated plants and food scraps, which could have included some animal protein. The high nitrogen stable isotope values of the chicken bones may also reflect the consumption of extensively fertilised plants. Unfortunately, there are not enough data to make inferences about whether and how the conditions of feeding and keeping chickens changed between periods and different regions.

Unlike chickens, geese occupy a distinct ecological niche compared to the other sampled terrestrial fauna from the study region, with little overlap between their carbon and nitrogen isotopic values (Fig. 2). The relatively low $\delta^{13}C$ values resemble those of other wild mammals, suggesting that they occupied a habitat that was influenced by wild, uncultivated plants and/or freshwater environments. For example, domestic geese were often kept in enclosed paddocks near ponds (Kasebier 1931). The wide variation in the $\delta^{15}N$ values of the geese suggests different dietary sources and is best explained by the inclusion of animal protein (e.g. from food scraps) or intensively manured crops in their diet. The highest nitrogen isotopic values may also be related to the fattening of the birds (with skimmed milk, meat and bone meal, and fish offal; see Kruus 1964), which would be in accordance with the evidence presented above concerning the importance of geese as feast food.

While differentiating between wild and domestic geese is problematic and the wide variation in the isotopic values of the sampled geese may represent wild specimens with diverse habitat and feeding preferences, the available evidence (considered together with morphometrics) does suggest that the majority of the geese sampled for stable isotopes were domestic (Ehrlich et al. 2022a). This is supported by the fact that most geese also had $\delta^{34}S$ values similar to the regional terrestrial sulphur isotopic baseline (Aguraiuja-Lätti et al. 2022), suggesting that

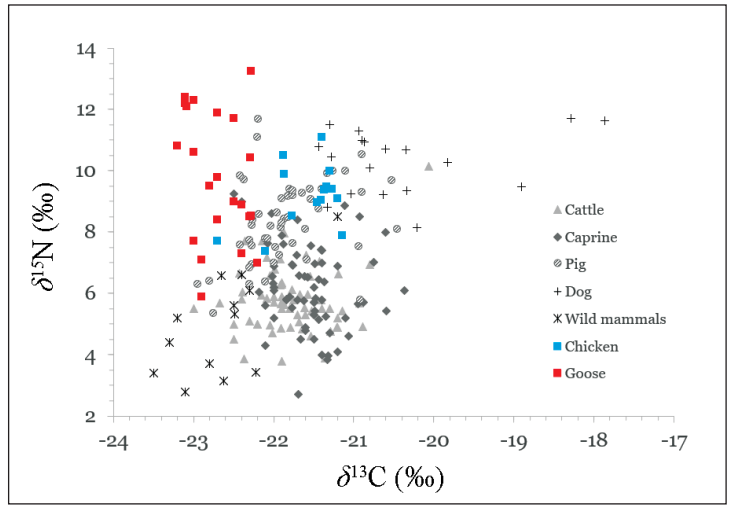

FIG. 2. Stable carbon and nitrogen isotope values of terrestrial fauna, including chickens and geese, from medieval and early modern sites in Estonia (data compiled from Lightfoot et al. 2016; Ehrlich et al. 2022a; Aguraiuja-Lätti et al. 2022; Malve et al. 2023).

they could have been local in origin (i.e. domestic and not wild/migratory). Even the geese from coastal sites had purely terrestrial (local) $\delta^{34}S$ values with no marine influence (which could have suggested that the sampled birds were undomesticated).

BIRDS AS INDICATORS OF SOCIAL STATUS

Birds have also been important indicators of social status. One group of such birds are different galliforms. Of domestic birds, the turkey (*Meleagris gallopavo*) can be considered a luxury species as they were introduced to Europe only at the beginning of the 16th century (Reitz et al. 2016 and references therein). Of the sites discussed in this paper, one bone was found in early modern suburban Tallinn and three at the early modern Haapsalu Castle (Ehrlich 2022, 45–47). Even though turkeys were often kept as pets in Europe during the Early Modern Period, two coracoids discussed in this paper had cut marks (one from Tallinn and one from Haapsalu Castle), indicating that they were also eaten. Turkey bones with cut marks are also present at Vilnius Lower Castle in Lithuania from the 16th century onwards (Ehrlich et al. 2023).

During the Medieval Period, hunting wild birds was the privilege of people of higher social status (Põltsam-Jürjo 2013, 55). The material analysed for this paper has demonstrated that the number of wild species from castles is exceptionally high, compared to other sites in the region. This is most likely related to the nature of the upper social class diet, where the consumption and/or keeping of wild and rare birds was a regular occurrence. By the mid-16th century, these practices became increasingly associated with wealth and were also common in guilds, fraternities and at the events of wealthier artisans (Mänd 2004, 344–346); therefore, the presence of those species could be expected in towns as well. The most common wild species found in the analysed archaeological material are the black grouse (*Lyrurus tetrix*) and the western capercaillie (*Tetrao urogallus*). At least one of those species is present at every site, apart from the Lohkva settlement site. At several sites (Vastseliina, Karksi, Otepää, Sargvere, Tartu and Tallinn), the bones of the black grouse or the western capercaillie have cut marks both in meaty body parts and in skeletal elements with less meat. For example, the western capercaillie is also mentioned as a dish served at guild feasts in the 16th century (Põltsam-Jürjo 2013, 55). Feathers of the western capercaillie were probably used, as cut marks are present on the carpometacarpi from the suburban area of early modern Tallinn and Vastseliina Castle. Similarly, western capercaillie wing bones with cut marks have been found at Vilnius Lower Castle, Lithuania (Ehrlich et al. 2023). Among other wild galliforms, the grey partridge (*Perdix perdix*) was present at the Vastseliina, Põltsamaa and Viljandi castles (Ehrlich et al. 2022b). The bird is also mentioned in written sources in connection with a feast to honour Wolter von Plettenberg, Master of the Livonian Order, that took place in 1513 at Tallinn Town Hall (Mänd 2004, 345, table 6b; Põltsam-Jürjo 2013, 55). Bones of the hazel grouse (*Tetrastes bonasia*) were found at the Karksi, Viljandi, and Vastseliina castles. The species was additionally present at the medieval Kastre Castle and in the medieval or

early modern deposits of the Padise monastery and the suburban area of Viljandi (Lõugas et al. 2012; 2019; Ehrlich et al. 2022b).

In addition to wild galliforms, other wild birds include the Eurasian woodcock (*Scolopax rusticola*), which was present at Vastseliina Castle, while charadriiforms were found in the suburban and urban material from Tallinn and Tartu, respectively. The Eurasian woodcock has also been found at other medieval castles – Kastre and Viljandi (Lõugas et al. 2019; Ehrlich et al. 2022b). The Eurasian crane (*Grus grus*) was present at Vastseliina Castle and in medieval Otepää, while the swan (*Cygnus* sp.) was found at Viljandi Castle. Previously, the Eurasian crane has been found at the early modern Viljandi Castle and the medieval Kastre Castle and the swan in the suburban area of Tallinn (Lõugas et al. 2019; Tomek 2019; Ehrlich et al. 2022b). Both of those species are also mentioned as dishes served at guild feasts in the mid-16th century (Mänd 2004, 332; Põltsam-Jürjo 2013, 124).

Among the Columbidae, both the rock dove (*Columba livia*) and the common woodpigeon (*Columba palumbus*) were identified. While the rock dove is not native to Estonia, its domesticated form (*Columba livia domestica*) is quite widespread nowadays. Rock doves were probably brought to Estonia from Germany as cage birds, with some of them possibly escaping captivity and becoming feral (Lundevall & Bergström 2005). However, we lack more detailed information about the breeding of this species in the past. At Vastseliina Castle, a pigeon's (*Columba palumbus* or *Columba livia*) coracoid displayed cut marks, indicating that they were eaten in the castle. Pigeon bones (without cut marks) were also present at Põltsamaa Castle and Haapsalu Castle. In addition, a previous study by Ehrlich et al. (2022b) reported the presence of juvenile pigeon bones at Viljandi Castle, further suggesting that they may have been bred there. Although these bones also lacked cut marks, this should not be taken as evidence that the birds were not consumed, since even chicken bone assemblages in the current study only displayed cut marks on up to 26% of the bones.

At Vastseliina Castle, the osprey (*Pandion haliaetus*), the western marsh-harrier (*Circus aeruginosus*) and the lesser spotted eagle or the greater spotted eagle (*Clanga pomarina* or *Clanga clanga*) were found, all represented by skeletal elements from limbs. The presence of several species of Accipitridae at high-status sites has been considered as proof of hawking (Bochenski et al. 2016, 666; Mulkeen & O'Connor 1997), since these species would probably not have been scavengers in human settlements. However, not all Accipitridae indicate hawking, in fact, all three species identified in this study are rather unlikely to be used for this purpose (e.g. Bochenski et al. 2016, 666 for *Circus* sp.). At the same time, evidence supporting hawking has been found at other castles in the region, like Viljandi, Estonia and Vilnius, Lithuania (Blaževičius et al. 2012; Ehrlich et al. 2022b; Rumbutis et al. 2018). Hawking was directly related to higher status because training birds is time consuming and there are better ways to catch birds and smaller mammals for food (Serjeantson 2009). For the presence of wing bones, collecting feathers is another

possible explanation (e.g. Makowiecki & Gotfredsen 2002, 77, regarding *Haliaeetus albicilla* at coastal sites).

Conclusions

This is one of the first studies that compares bird bones from different sites and periods across Estonia. Sixteen sites in both inland and coastal regions were included, demonstrating a difference in the proportion of water birds. The high number of water birds found at coastal sites seems to suggest that those birds – geese and ducks – were more likely a wild resource. However, both wild and domestic specimens have been identified by morphometrics and stable isotope analysis. As usual, the chicken was the most numerous species. For meat, a significant amount of juvenile birds was consumed, especially at Viljandi Castle, but note should also be taken of eggshells from Tartu cesspits, identified as chicken eggs. By site type, the list of species was the most abundant at castles where a variety of wild birds were found, probably indicating different practices, e.g. conspicuous meals, but also human activities not directly related to food. Wild birds were also common in towns and suburbs, while at settlement sites and a hilltop site the list of species was very short. The sites were difficult to compare chronologically as most of the material discussed in this study originates from the Early Modern Period. However, it seems that the number of different species grows in time. One of the main differences between the periods is the introduction of the turkey. This study feeds into the discussion on the usage of birds in the past; however, more information about settlement sites and archaeological sites from the Iron Age are needed in the future to make comprehensive conclusions.

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Zooarheoloogia andmed lindude kohta Eestis kesk- ja varauusajal (u 1200–1800)

Freydis Ehrlich, Ülle Aguraiuja-Lätti ja Arvi Haak

RESÜMEE

Artiklis analüüsitakse kaheteistkümnest Eesti keskaegsest ja varauusaegsest leiukohast (ajavahemikust ligikaudu 1200–1800) kogutud linnuluid. Eesmärk oli uurida lindude ja nende saaduste kasutamist erinevates piirkondades ning kontekstides zooarheoloogilise, stabiilsete isotoopide ning ZooMSi analüüside abil. Tegu on Eesti linnuluude zooarheoloogilise materjali esimese käsitlusega, mis vaatleb võrdlevalt eri liiki muististest (linnadest, linnustelt ja ka maa-asulatest) kogutud luid ning annab seeläbi parema ülevaate lindude tähtsusest ajaloolise aja inimestele. Käsitletud muististest (joonis 1) on varaseim rauaaja ja keskaja alguse Pöide linnus Saaremaal. Enamik määratud linnuluid pärineb linnustelt: lisaks varem uuritud Viljandile ja Kastrele leidus linnuluid projekti raames uuritud muististest arvukamalt Vastseliinas; arvestatav hulk linnuluid pärineb ka Tallinna ja Tartu eeslinnades ja linnaterritooriumil kujunenud ladestustest. Erinevaid liike leidus enim linnustel (Vastseliinas üle 20, varem on Viljandi linnuselt leitud üle 30 linnuliigi). Maa-asulatest õnnestus tuvastada vaid üksikuid linnuluid. See võib olla tingitud asulakohtade materjali vähemast uuritusest ning erinevatest väljakaevamise ja zooarheoloogilise ainese kogumise meetoditest.

Tulemused näitavad, et ülekaalukalt kõige levinum lind oli kodukana, seda sõltumata perioodist ning leiukohast. Kanaluude seas leidus erinevas proportsioonis noorlindude luid (sõltuvalt muistisest 4–42%), järelikult tarvitati linnustes ja ka linnades neid arvestataval määral toiduks, samuti võis tuvastada mõne kuke. Kanale järgnesid tähtsuselt hani ja part. Veelindude (eriti hane ja pardi) kõrge osakaal oli iseloomulik eelkõige rannikul asuvatele leiukohtadele, kuid nende puhul ei saa olla täiesti kindel, kas tegu oli kodustatud või metsikute isenditega. Nende eristamise

võimaluste üle arutletakse artiklis samuti. Ka metslinnud olid materjalis esindatud, kuid eelkõige linnustel, ning nende osakaal oli oluliselt väiksem. Siiski leiti Sargvere asulakohalt mõned metsikute kanaliste (valdavalt tedre) luud.

Lisaks lihale kasutati linde ka munade ja sulgede saamiseks. ZooMSi analüüs näitas, et kõik kuus munakoore katket Tartu jäätmekastist kuulusid kanale. Stabiilsete isotoopide analüüsi tulemused osutasid, et kanu toideti valdavalt majapidamisest ülejäänud toidujääkidega ning et hanesid võidi nuumata valgurikka söödaga, järelikult olid uuritud haned kodustatud.

Linnud (eriti metsikud liigid) näitasid ka sotsiaalset kuuluvust. Kalkun oli varauusajal Euroopas haruldane liik, keda peeti lemmikloomana, kuid Tallinnast ja Haapsalu linnuselt leitud kahel varauusaegsel kalkuniluul esines ka lõikejälgi, mis viitab nende kasutamisele toiduna. Metslindude küttimine oli kõrgema sotsiaalse klassi privileeg ning metsikute liikide luid on eriti palju leitud just linnuste materjalist. Nendest kõige levinumad on teder ja metsis, aga teiste seas on esindatud ka nurmkana, laanepüü, metskurvits, sookurg ja tuvi. Mitmeid neist liikidest mainitakse kirjalikes allikais seoses kõrgklassi pidustustega. Leiti ka mitmeid liike, mille esinemist linnustel ei saa seostada toitumisega – osa neist olid inimkaaslejad, teiste luuleidude esinemise põhjuseid tuleb veel selgitada. Viljandi ning Vilniuse linnuselt on andmeid ka jahilindude pidamise kohta.