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ARCHAEOICHTHYOLOGICAL AND HISTORICAL DATA ON FISH CONSUMPTION IN VILNIUS LOWER CASTLE DURING THE 14TH–17TH CENTURIES

To date, no zooarchaeological or historical research on the consumption of fish in Lithuania in the Middle Ages or the Early Modern Period has been conducted. Over the period in question, Christian traditions were established in Lithuania; therefore, fish must have become an important part of people's nutrition, and especially in the elite diet. During the archaeological excavations on the site of Vilnius Lower Castle over the period of 1988 through to 2015, a collection of about 80,000 animal bones, mainly dating back to the period from the 14th to the 18th century, was assembled, including 331 fish bones. Upon carrying out their zooarchaeological analysis and making use of historical data, this paper presents the fish consumption of the highest social layers in Vilnius Castle, the species and sizes of fish served and the changes in fish consumption habits over different periods of the Castle development. The research showed that the most frequently consumed species of fish in the Castle in the period from the late 14th through the 17th century was pike, followed by different cyprinids and pike perch. Fewer bones belonged to sturgeon, wels catfish, perch and salmon. No remains of marine fish were found. Herring bones were not found, probably due to hand collection of the bones, while cod was probably not consumed at all. In Vilnius Lower Castle, two bones of the common carp, so far the only ones identified in Lithuania, were found, one of them dating back to the late 14th – early 15th century and thus testifying to the early introduction of the species. In the collection analysed, large fish of different species predominated. However, this may be related not only to the exclusive history of the historical site and its upper class residents, but also to the excavation/collection techniques.

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Introduction

Fish has always played an important role in the daily diet of people living in the Baltic Sea region (Enghoff 1999; Makowiecki 2003; 2008). Surely, depending on the geographical circumstances, the period, the development of culture, and

even on different fishing techniques and tools, the amount of fish consumed could vary considerably. Admittedly, such archaeological material has been scarce in all periods since, unlike mammals or even birds, the skeletal fragments of fish are considerably smaller. The scarcity of such material has also been influenced by other factors, such as food waste disposal habits, the conditions of survival of the osteological material, the quality of analysis, etc.

It is evident that both in the Stone Age and in the Early Modern Period people in Lithuania did eat fish (Stančikaitė et al. 2009; Dambrauskaitė 2018a; 2018b; Teterėva et al. 2018). Admittedly, up to the present time, we have known very little about the species or amounts of fish consumed. Fish bones are scarce in Lithuanian zooarchaeological material and up until now they were rarely identified to the level of species during zooarchaeological analyses. Only the more abundant remains of the Stone Age ichthyofauna were examined more thoroughly (Stančikaitė et al. 2009). The dead were mainly cremated in pagan medieval Lithuania before the Christianization in 1387 (Petrauskas 2016), therefore the widely-applied stable isotope analysis of humans can hardly help to reconstruct fish consumption in their diet. Because of that, the analysis of ichthyofauna still remains the main source for the knowledge on this topic.

The consumption of fish in Lithuania increased in the 15th century, i.e. after the adoption of Christianity, when Christian traditions were followed and the consumption of fish acquired an important religious and cultural meaning (Yeh et al. 2014; Dambrauskaitė 2018a). Based on the written sources, the elite in Europe did consume extensive amounts of fish during the fasting of 166 days per year (Braudel 2009). In accordance with the sources, the upper classes in Lithuania and Poland regularly observed a fasting tradition in the period of the 15th through to the 17th century. A good proof of that was provided by the accounts and the menu in the Vilnius residence of Sigismund II Augustus, the King of Poland and Grand Duke of Lithuania, who ruled the Duchy of Lithuania from 1554 to 1572 (Dambrauskaitė 2018a; 2018b). In Poland, historically close to Lithuania, a number of studies on the remains of fish from the Middle Ages and the Early Modern Period have been carried out, and fish consumption traditions have been discussed in various publications (Dembińska 1999; Makowiecki 2001; 2003; 2008; Makowiecki et al. 2016). Given the historical situation and close relationships between the Grand Duchy of Lithuania and Poland, one can assume that the elite's eating habits could have been similar. Stable isotope analysis suggests that between the 16th and the 18th century, fish might have been an important part of the elite's diet both in Lithuania and Poland and could have been consumed in much larger amounts than by the representatives of lower classes. However, the Lithuanian elite probably consumed less fish than their Polish counterparts (Reitsema et al. 2014; 2015). The stable isotope analyses carried out in recent years revealed that monks of the Church of the Holy Trinity (Uniates) and Basilian Monastery, who settled in Vilnius in the 18th century, also ate a lot of fish (Simčenka 2018).

An opportunity to study the subject somewhat more extensively occurred as a collection of zooarchaeological material was assembled during the excavations of Vilnius Lower Castle (hereinafter referred to as VLC). Successive archaeological excavations from 1988 to 2015 produced about 100,000 animal bones and bone fragments. Due to their improper storage and negligence, only about 80,000 were transferred to the funds of the National Museum, Palace of the Grand Dukes of Lithuania, founded in 2009. Even though fish bones accounted for slightly less than 0.5% of the finds, their analysis pointed to new aspects of eating habits in this unique archaeological site of the Middle Ages and the Early Modern Period.

Through the analysis of the data collected in Vilnius Lower Castle, this paper seeks to find out what species and what size of fish were eaten from the late 14th through the 17th century and how fish consumption habits changed in different periods of the Castle development. Moreover, by comparing the acquired data with the information of written sources, the representativeness of the archaeological finds was analysed.

Archaeological and historical context

The Lower Castle of Vilnius is one of the most valuable and most extensively investigated archaeological sites of the Middle Ages and the Modern Period in Lithuania (Fig. 1). Successive archaeological excavations started there in 1988 and lasted until 2015. As established during the excavations, the area was actively inhabited for over 700 years. Cultural layers of up to 7–8 m were formed in which, due to the high groundwater level and other circumstances, even some fast disintegrating organic materials had survived. The favourable anaerobic

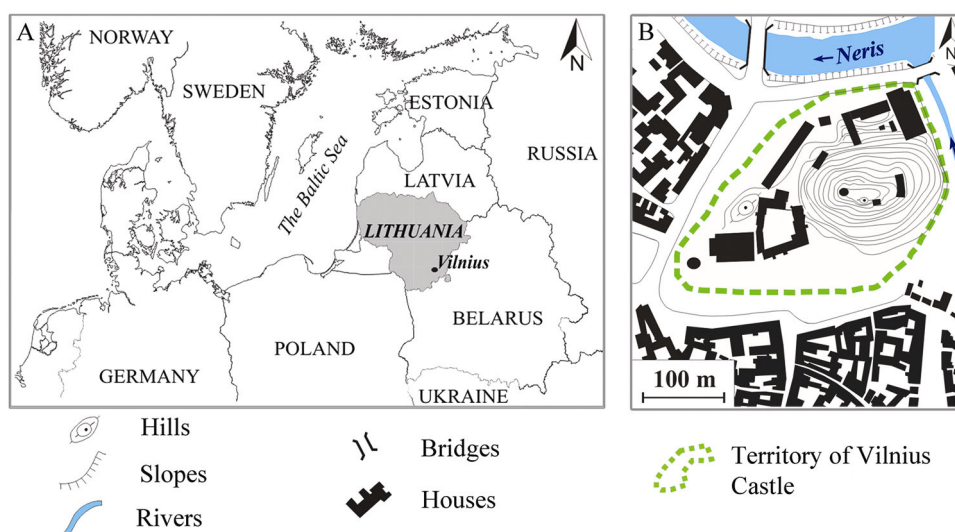


Fig. 1. Location of the Vilnius Castle complex.

milieu preserved the structures of wooden buildings and roads, household items and leather clothing details, as well as zooarchaeological remains, i.e. the relicts representing the daily diet of the inhabitants of the Castle and the Palace.

The three decades of archaeological excavations in VLC resulted in a solid collection of bones and bone fragments. The earliest finds belonged to the settlement of the 4th to the 9th century, although these were scarce. The zooarchaeological finds dating back to the 13th to mid-14th century reflected the stage of the construction of the Castle, and the late 14th to the 15th century represent the period of its prosperity. In the early 16th century, on the site of the Castle, a new Palace of the Grand Dukes of Lithuania (hereinafter referred to as GDL) was erected, and this complex survived until late 17th century. From the 18th to mid-20th century, the former residence of the rulers housed the units of different armies or was managed by city dwellers. The zooarchaeological material representing these five essential stages of the site development has not been studied extensively (Daugnora & Piličiauskienė 2005; Piličiauskienė 2008; Blaževičius et al. 2012). Little is known about the consumption of fish in the period from the 13th to the 17th century: analyses of small samples of fish remains from the castle area excavations were insufficient (Steponavičienė & Racevičius 2003; Kuncevičius et al. 2015; Teterova et al. 2018). Moreover, almost no written sources have been published on the consumption of fish in the cuisine of the GDL – the outcomes of such research are to appear in 2018 (Dambrauskaitė 2018a; 2018b). In the framework of the project implemented in the years 2016 to 2018, comprehensive analyses of mammalian, bird, and fish bones as well as bone and horn artefacts were carried out (Luik et al. 2018). Summarized outcomes, supplemented with the information of historical sources, appear at the end of 2018 in the form of a monograph.

Coming back to the fish remain analyses, it must be emphasized that, undoubtedly, the character of the previous excavations led to the situation when the methodology of the find collection did not allow the collection of all small bones (e.g., those of herrings) and scales. However, even if the material was relatively scanty, it was undoubtedly worthwhile to examine the ichthyofauna, especially since the archaeological excavations of the castle area were actually completed and the scanty material was all that we got from the site important to Lithuania, Poland, and the entire East Baltic.

The material and methods

During the archaeological excavations on the VLC site, bones were mainly collected by hand, therefore, among over 80,000 animal bones analysed, merely 331 bone fragments (500 g) and several scales belonged to fish. In 2015, in the layer related to the 17th century kitchen, an additional 3,993 scales were collected by means of sieving and analysed (Teterova et al. 2018). The bones examined were divided into five groups, given the above mentioned stages of the historical development of the Castle area. However, the present paper dealt with the fish

remains from the two main, and also most abundant groups, those of the second half of the 14th to the 15th century and the 16th to the 17th century, altogether 290 bone fragments (430 g). Of the 41 remaining bones, 15 were chronologically obscure, while 26 belonged to three other stages of the development of the castle site and were not discussed due to their small number. The fish bones found during the archaeological excavations in 2015 and 2016 and previously analysed by Piličiauskienė (Kuncevičius et al. 2015, 203 ff.) were also included in the present study.

The fish bone identifications were carried out using the comparative reference collection stored in the Bioarchaeology Research Centre of the Faculty of History, Vilnius University. The material is stored in the National Museum – Palace of the Grand Dukes of Lithuania. Quantification of the fish remains was based on a count of the total number of identified specimens (NISP) of each taxon. The size of the fish was determined by the fish of a known length in a reference collection.

Fish remains

In the layers of the late 14th and the 15th century, 202 fish bone fragments were found with the total weight of 347 g; 164 (81.2%) were identified to the family or species level. The bones belonged to 11 species of freshwater and migratory fish. Their species composition is presented in Table 1 and Figure 2. The most commonly found bones were those of pike (40.5%), followed by cyprinids (25.2%) and pike perch (17.7%). The bones of wels catfish (7.3%) and sturgeon (6.1%) accounted for somewhat more substantial segments, moreover, some perch and salmon bones occurred.

Table 1. Fish taxa from the examined assemblages. NISP = number of identified specimen

Species		14th–15th c.		16th–17th c.	
		NISP	%	NISP	%
Pike	<i>Esox lucius</i>	66	40.2	20	30.3
Pike perch	<i>Sander lucioperca</i>	29	17.7	10	15.2
Perch	<i>Perca fluviatilis</i>	4	2.4	1	1.5
Wels catfish	<i>Silurus glanis</i>	12	7.3	4	6.1
Salmon	<i>Salmo salar</i>	2	1.2	1	1.5
Sturgeon	<i>Acipenser</i> sp.	10	6.1	4	6.1
Cyprinid	<i>Cyprinidae</i>	18	11.0	19	28.8
Bream	<i>Abramis brama</i>	15	9.1	5	7.6
Tench	<i>Tinca tinca</i>	4	2.4		
Common carp	<i>Cyprinus carpio</i>	1	0.6	1	1.5
Ide	<i>Leuciscus idus</i>	2	1.2		
Asp	<i>Leuciscus aspius</i>	1	0.6		
Vimba	<i>Vimba vimba</i>			1	1.5
Total identified		164	99.8	66	100.1
Unidentified		38		22	
Total fish		202		88	

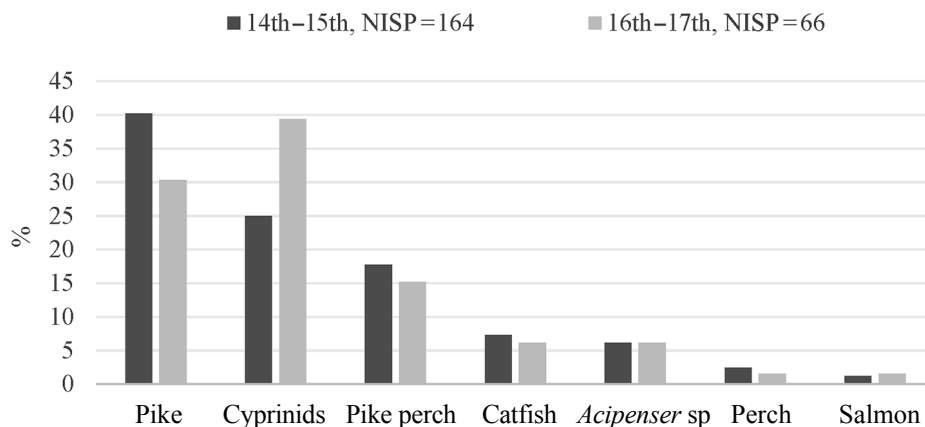


Fig. 2. Distribution of bones of different fish taxa within Vilnius Lower Castle assemblages.

The size of the pikes varied from 45–50 to approximately 110 cm in length; some even larger specimens occurred, however, the majority of the pike bones belonged to 60–80 cm long fish (Fig. 3). The pike perches were also large: almost half of their bones (42.9%) belonged to 60–70 cm long, and 28.6%, to 80–90 cm long specimens. The bream and tench representatives were large, too, mainly 45–50 cm, and one vertebra of a cyprinid, possibly of a common carp, belonged to a 100 cm long fish. The length of a found salmon amounted to about 90–100 cm, and the remains of wels catfish and sturgeon specimens also came from large fishes, longer than 100 cm. A common carp's operculare belonged to a large 80–90 cm long fish.

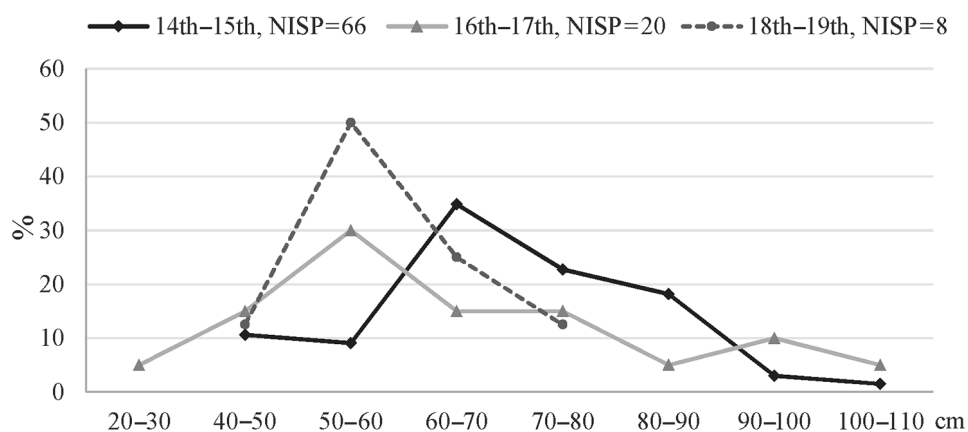


Fig. 3. Estimated length of pike from different stages of Vilnius Lower Castle.

In the layers of the 16th and 17th centuries, the bones of 88 fish were collected (83 g), including 66 (75.0%) identified ones. The bones belonged to 9 species of freshwater and migratory fish, and their composition was presented in Table 1 and Fig. 2. In the material of the period, the majority of the fish remains belonged to cyprinids (39.4%), followed by pikes (30.3%) and pike perches (15.2%). Moreover, several bones of each of wels catfish, sturgeon, perch, and salmon specimens were found.

The size of the fish was similar to that of the previous period material: the length of the cyprinids varied from 30 to 55 cm, with the bones of 40 to 50 cm fish prevailing, while a common carp's operculare (with a cranial edge of the bone cut off) again belonged to a large, 80–90 cm long fish. The pikes were 20 to 110 cm long, with the prevalence of 50 to 80 cm long specimens (see Fig. 3), and among the pike perches, 60 to 70 cm long fishes prevailed. Except one pectoral spine of wels catfish length of 50–60 cm, all bones of a wels catfish and a sturgeon were the remains of fish over 100 cm, and of a salmon, around 100 cm in length.

The bones of both periods represented different parts of fish skeletons. Among the material of the late 14th to the 15th century, 56.6% were head bones, and the amount of head bones in the material of the 16th to the 17th century was somewhat smaller, i.e. 36.4%. Among the pike bones of the late 14th through the 15th century, the most frequent was the dentary bone, while in the 16th to the 17th century, those were vertebrae. Meanwhile, the vertebrae were the most commonly collected part in the remains of the cyprinids and wels catfish in the material of both periods. A substantial part of the pike's dentary bones and the majority of the bones of large fishes – wels catfish and sturgeon – had cutting marks, while one cleithrum of a wels catfish was cut with a saw.

Discussion

The composition of fish bones by species in VLC was basically consistent with the historical data in accordance with which the Duke's Court and all elite's favoured freshwater fish, mostly pike (Kuncevičius et al. 2011; Laužikas 2014; Laužikas et al. 2016; Dambrauskaitė 2018a; 2018b). Admittedly, in the material of the 16th to the 17th century, the number of cyprinid slightly exceeded that of pikes. The examined amount of bones was relatively small, therefore, the slight differences identified may be insignificant. We found information about the consumption of fish in the 18th century in the accounts books of the monks of the Vilnius Church of the Holy Trinity (Uniates) and Basilian Monastery. The monks did not have their own fish ponds and therefore used to buy fresh, salted, and dried fish. In the period from 1765 to 1781, the most frequently purchased fish was pike (142 mentions), followed by perch (48 mentions), bream (39 mentions), salmon (33 mentions), and eel (31 mentions) (Kuncevičius et al. 2018). According to zooarchaeological data, the most common fish in the Early Medieval Poland sites were pike and perch, although later, due to the spread of cod, their share decreased significantly (Makowiecki 2008, 763; Makowiecki et al. 2016).

Bones of the cyprinids were the second most numerous group among the bones analysed, and most were identified as those of bream, slightly fewer of tench, and several bones of ide, common carp, vimba and asp (see Table 1, Fig. 2). In the material analysed, crucian carp (*Carassius carassius*) bones were also discovered, although they belonged to the layers dating back to the 17th to the 18th century. In the context of historical data, fish of the above mentioned species, and especially those of crucian carp, tench, perch, and trout were frequently mentioned in the accounts of Dukes and in other documents. Among other fish species, vendace (*Coregonus albula*), grayling (*Thymallus thymallus*), gobio (*Gobio gobio*) and even stone loach (*Barbatula barbatula*) were mentioned, however, they were consumed less frequently (Michalewicz 1965, 705; Dambrauskaitė 2018b). Just a few perch bones and basically no crucian carp bones were identified among the remains analysed; probably, due to the fact that the bones were collected by hand. In accordance with historical data from the 16th century, the second most popular fish in the Duke's Court was the common carp, however, in our research, only two undoubtedly common carp bones (operculare) were discovered: one in the material of the late 14th through the 15th, and another of the 16th century. Those are the only remains of the common carp known in Lithuania to date. In terms of the common carp spreading in Eastern Europe, the common carp in Vilnius dating back to the late 14th through the 15th century is an early find: the species spread in Poland as late as in the 15th to the 16th century (Hoffmann 1994; 1995; 2005; Makowiecki 2008). Somewhat surprisingly, no more common carp bones were found in the layers of the 16th–17th century, all the more so that, in accordance with the historical data, common carp was not a very expensive fish in that period, less expensive than pike, and therefore it is believed not to have been luxury food (Dambrauskaitė 2018b). The small number of common carp bones can be explained for several reasons: first, in the 15th, and possibly also in 16th century, they were hardly bred in Lithuania and second, they belonged to rarely consumed species of fish, popular only with the elite. However, that does not explain why common carp bones were scarce in the Castle associated with the elite. Another reason for the small number of common carp bones among the analysed ones may be their collection by hand: the bones of smaller common carps were simply left uncollected. Daniel Makowiecki (2003) states that freshwater lakes were rich of native fish in this area of Europe and it was not necessary to construct artificial ponds for carp breeding. However, fish ponds for pike, local cyprinids and other local fish were popular among the Lithuanian nobility. Most likely the consumption and breeding of carps was not undertaken because of the lack of other local fish, but because of the demand of nobility for exclusiveness and novelties. According to the historical sources, two of the earliest ponds for common carp breeding were dug out in 1615 in Biržai estate (northern Lithuania) by Krzysztof Radziwiłł II. Common carps for breeding in Biržai were brought from Courland, Prussia and Radzwill's Działacichy manor (modern western Belarus) (Karvelis 2009, 232).

In the material of both periods, the remains of the pike perch took the third place, after the pike and the cyprinids (see Fig. 2). Therefore, the most surprising thing was that the pike perch was not mentioned in the accounts book either of the rulers or the 18th century Uniate monks (Dambrauskaitė 2018a; 2018b; Kuncevičius et al. 2018), even though it was known that the pikeperch was a common meal during the fast in Poland (Michalewicz 1965, 705; Topolski 1999, 299; cf. Dambrauskaitė 2018b). The remains of the pike perch were abundantly found in some early medieval sites in Polish regions close to the Baltic Sea (Makowiecki 2003; 2008) and in medieval Novgorod. However, in the latter case, the pike perch was not mentioned in the birch bark documents which recorded only prestigious fish intended for trade and seldom occurring among the fish remains, i.e. sturgeon and salmon. Meanwhile, the pike perch as well as the cyprinids or the pike were the fish used for everyday food; they were almost never mentioned in documents, yet their abundant remains were found during the excavations (Hamilton-Dyer et al. 2016). One can raise a hypothesis that the pike perch was not a prestigious fish and was not favoured by the elite. On the other hand, it was the pike perch cooked according to the 16th–17th century recipe of the GDL noble family of Radziwill that was included in the book *Imperial Austrian Cuisine* (Wagner-Witulla 1999; c.f. Kuncevičius et al. 2011, 134; Laužikas 2014, 110). The pike perch was also appreciated in medieval Sweden as one of the most valuable freshwater fish species (Andersson 1969, 528; c.f. Maltin & Johnsson 2018).

The share of the sturgeon bones in the material of both periods was the same (6.1%). In the period in question, the sturgeon was already rare and very expensive fish throughout Europe and, just like salmon, reserved for the upper classes (Dembińska 1999, 102; Makowiecki 2008). In the VLC material of both periods, the amount of wels catfish bones was similar to that of sturgeon bones. In the written records, wels catfish was not mentioned frequently, however, the amount of bones found was relatively large; a similar trend was also observed in Poland (Dembińska 1999, 102; Makowiecki 2008). Both sturgeon and wels catfish were large fish which must have predetermined a similar amount of collected bones, even though the value of the fish differed significantly.

In terms of the species composition, the material from Vilnius was different from the composition of the Northern European medieval ichthyofauna, in which the remains of marine fish accounted for 80–90%, and closer to the material of Poland with the prevalence of freshwater fish (Makowiecki 2008). The analysis of the VLC material did not detect either cod, or herring, or other marine fish remains. Vilnius was about 260 km away from the Baltic Sea, but the distance did not prevent the delivery of preserved fish to the city; moreover, the Palace of the Grand Dukes would get foodstuffs from more distant countries, such as oysters, figs, capers, almonds, etc. (Lietuvos didžiojo kunigaikščio 2009; Stančikaitė et al. 2009; Lietuvos didžiųjų 2010, 323 ff.). Moreover, marine fish in Poland was found in cities at a similar distance from the sea as Vilnius (Makowiecki 2001; Makowiecki et al. 2016). Cod was a popular kind of fish both in Northern,

Western, and Eastern Europe in the Middle Ages and the Early Modern Period and cod fish trade was especially widespread there between the 15th and the 17th century. Even on some sites of the neighbouring Poland, the remains of cod accounted for the greatest share of fish remains collected by hand (Dembińska 1999, 100; Makowiecki 2001, 239; 2008; Orton et al. 2011; Lūgas et al. 2016, 7; Makowiecki et al. 2016). It should be noted that an important role in their spread in the south-eastern and eastern Baltic region was played by the Teutonic Order. However, differently from various Polish cities, Vilnius never belonged to the Order, it was not its major trade partner, and was not culturally close to it. On the other hand, as mentioned in the written sources, the Master of the Order used to send herrings to Grand Duke Vytautas during the fast (Petrauskas 2003). It is worth mentioning that, before the 13th century, the Slavs who lived in Poland and in northern Germany did not have a tradition of eating cod either (Makowiecki 2001, 239; Schmölcke 2004). It would seem that Lithuanians, either during the period in question or later, did not eat cod or ate it very seldom; or possibly only the upper classes did not like preserved cod, just like the upper classes in Europe (Hoffmann 2005). The only vertebra of a medieval cod in the present territory of Lithuania was found in the former Castle of the Teutonic Order in Klaipėda (Memelburg), and it dated back to the late 13th – early 14th century (Piličiauskienė, unpublished data). Cod consumption in the GDL was hardly ever mentioned in historical sources. Cod was not mentioned even as late as in the mid-16th century accounts of the Dukes of the Grand Duchy of Lithuania; it appeared in the Duke accounts only in the 17th century. However, compared to the other fish, it was served in small amounts: one or two platters of dried cod, meanwhile, 41 pikes and 46 specimens of other species of fish as well as 15 platters of different fish were served during the same dinner (Dambrauskaitė 2018b). Neither was cod mentioned in the mid-18th century account books of the Vilnius Uniate monks (Kuncevičius et al. 2018).

The remains of the herring, another commonly consumed marine fish, were possibly not detected on the Castle site due to the hand collection of bones; however, in accordance with the historical sources, it must have been eaten there. In Vilnius, the Hanseatic merchants usually traded in herring (Jurginis et al. 1968, 85). Some authors tend to believe that herring was not part of the haute cuisine as references imply that it was bought for servants (Dambrauskaitė 2018a; Lietuvos didžiojo kunigaikščio, 2009). However, herring was regularly mentioned along with other fish served every day or for a feast table of dukes and noblemen, therefore, one can assume that it was eaten both by the ruler and by other representatives of the upper class (Kuncevičius et al. 2011; Laužikas 2014; Laužikas et al. 2016). Salted herrings in barrels were sent to the ruler's hunting grounds in large quantities (Dambrauskaitė 2018a; 2018b). Herrings were also included in the Vilnius Uniate monks' 18th century account books, although, despite their cheapness, they were rarely bought, just like the luxurious sturgeons. Among the species of fish, herrings and sturgeons took the 6th and 7th place respectively in accordance with the number of mentions in the monks' accounts (25 and 21

mentions) (Kuncevičius et al. 2018). In the 14th–15th century written records of Poland, herring was the most frequently mentioned fish (Dembińska 1999, 100).

The fish bones collected in the VLC area belonged to large fish. Of course, this may have been affected by the hand-collection technique, however, it should be borne in mind that in Vilnius Castle larger fish must have been eaten compared with the ordinary households of the city. Large fresh fish, such as pike, salmon, and sturgeon, were expensive and represented luxury and the privilege of the elite table not only in Lithuania, but also throughout Europe (Dembińska 1999, 100; Hoffmann 2005, 23; Dambrauskaitė 2018b). As demonstrated by the research in Poland, representatives of the upper class ate larger pikes and tench than the lower classes (Makowiecki 2008, 763). The research in Vilnius, even if small-scale, provided similar results. The pikes (NISP = 8) found in the area of the Lower Castle in the 18th–19th century, i.e. when it served other purposes than those of a Castle and the residential palace, were 40 to 80 cm long (half of them, 50 to 60 cm long) – smaller than in the 14th–17th centuries (see Fig. 3). As attested by fish scale analysis, the pikes found in the 16th and the 17th century Vilnius Old City were 17 to 42 cm long, while the length of the pikes found in VLC amounted to 30–95 cm, and the majority of the fish remains came from 40 to 60 cm long pikes (Tetereva et al. 2018). The scanty salmon bones in the Castle also belonged to large fish of about 100 cm long, such as were usually mentioned in historical sources and found during excavations (Dembińska 1999; Makowiecki 2008).

The diversity of the fish sizes served to the Duke's table was reflected in his accounts. The most comprehensive data were found on the pikes which were listed in four sizes: *large*, *slightly smaller*, *a cubit long* (60–70 cm), and *smaller*. Mainly a cubit-long and smaller pikes were served. The size of other fish, such as common carp, crucian carp, bream, and tench, was defined as *large*, *small*, and *usual*, of the salmon as *large*. Sometimes fish were simply defined as *fat* (Dambrauskaitė 2018b). It is worth remembering that the majority of the pike bones found in the VLC material of both periods belonged to the cubit size and smaller fish, i.e. 50–70 cm long.

A pike-related find of a somewhat different character was discovered in the material of the 14th to the 15th century: it was a pendant with a hole in the centre, made of a pike vertebra. Similar fish bone pendants were known in Poland, Ukraine, Germany and other countries. Beads made of pike, wels catfish, salmon, cod vertebrae or sturgeon scutes, had protective meaning and were also used for rosaries or jewellery (for more detail, see Makowiecki & Makowiecka 2017; Makowiecki 2003; Gorobets et al. 2017, 19). One cannot draw reliable conclusions based on a single find; nevertheless, one may hypothesize that either a similar tradition existed in Lithuania or the pendant was lost by some foreign guest. Another pike vertebra with clearly visible cuts on the external surface, dated to 16th century, could be identified as a potential counter or game checker.

Another piece of valuable and very interesting information provided by historical sources focuses on from where, how much, and what kinds of fish were delivered to the kitchen of Sigismund II Augustus and his retinue in the

VLC in the mid-16th century. The data were more extensively discussed by Neringa Dambrauskaitė (Dambrauskaitė 2018a; 2018b) whose research revealed that the fish was supplied from the ruler's rivers, lakes, and fish ponds or was purchased in the market place. The King personally took care of the building, supervision and maintenance of the fish ponds (Gudavičius 1999). Pikes were known to have been bred in the royal Viršupis fish ponds close to Vilnius: they were the principal source of fish for the ruler during his residence in Vilnius (Dambrauskaitė 2018a; 2018b). In the fishponds of the Knyshin Manor (north-eastern Poland), pike, crucian carp, perch, tench, and trout were bred (Maroszek & Leońszuk 2011, 46 f.). From the royal Viršupis fish ponds, about 70 live and another 30 to 118 dead pikes were delivered every week. Visitors of the royal court would bring other kinds of fish, such as bream, perch, roach, and wels catfish, already salted. The amount of the fish brought by visitors was mentioned to have been from several to 50 or more barrels. Some fish would be delivered to Vilnius from places 100 km or farther away. Moreover, fish was purchased in the Vilnius market-place (Dambrauskaitė 2018b).

As attested by Sigismund II Augustus account books, in one year (1566), fish of 12 species were purchased for the King's table, nonetheless, pikes were the most important and were eaten most frequently, several times per day both during the fast and during different feasts. The price of the pike compared with other fish was extremely high, and the largest fish were the most expensive. For an ordinary dinner, 1 to 3 large pikes as well as up to several dozen smaller fresh and dried pikes were served (Dambrauskaitė 2018a; 2018b). For special feasts, serving pikes in jelly was mentioned; the dish was often made on the occasion of royal receptions (Dembińska 1999, 102; Laužikas et al. 2016; Dambrauskaitė 2018b). In terms of abundance, pikes were followed by common carps, served in numbers from several to 118 per day. Other frequently served fish included crucian carp, tench, perch, roach, bream, salted eel, fresh and salted trout, ide, herring, and dried salmon. The number of fish served to the King's table on an ordinary day of fasting was quite impressive: 158 fish of 6 species, most of them fresh, and some other dried and salted (Dambrauskaitė 2018b). They may have produced about 10,000 to 15,000 bones in just one day.

Bone collection methods have undoubtedly affected the representativeness of the fish species. One can assume that, in the case of the analysed fish, large fish (catfish, sturgeon, pike, and pike perch) were over-represented, while the remains of the cyprinids and perch were under-represented, and more of them could have been collected by sieving. This assumption can be substantiated by the excavations in the VLC in 2015, when a 60 l sample of soil dating back to the 16th–17th century was taken and analysed. On sieving the soil by 1 mm mesh, 3,993 scales were collected, including 3,830 those of the cyprinids, 43 of the bream, 29 of the pike, 18 of the roach (*Rutilus rutilus*), and several of each the crucian carp (*Carassius carassius*) and the common dace (*Leuciscus leuciscus*) (Tetereva et al. 2018). However, this was a small-scale analysis of one object in the kitchen environment, possibly reflecting one episode of its activity. The remains of fish

(only scales were found) were seen with the naked eye, collected by hand together with soil, and then sieved. Therefore, this small-scale analysis does not allow us to draw reliable conclusions on possible differences in establishing the species of the fish consumed in the Castle by applying different excavation and collection techniques. However, it has to be noted that during the research, three species of fish – roach, crucian carp and common dace were identified whose remains did not occur in the material of the 14th to the 17th century analysed by the authors. Numerous research proved that, in case of sieving, the amount of the remains of small cyprinids increased. Significant species-related changes depending on the excavation techniques were recorded in the Šventoji Stone Age sites (Piličiauskas 2016; Piličiauskienė unpublished data) as well as in the medieval Novgorod, where the share of the cyprinids increased from 26% in the material collected by hand up to 60% in the sieved material (Hamilton-Dyer et al. 2016).

The fact that the residents of the Castle must have consumed a lot of fish and that it had not always been prepared for eating in a quality way was testified to by the data analysis of a different type. After the parasitological analysis of the samples of the 16th century latrine and the cultural layers of the 14th through the 16th century, fish tapeworm *Diphylobotrium latum* eggs were found, with their concentration particularly high in the latrine. People are infected with these fish parasites through eating insufficiently heat-treated fish, and a large amount of such parasite eggs can imply intensive consumption of badly cooked fish (Blaževičius & Žiliukienė 2013; Yeh et al. 2014).

Concluding remarks

On comparing the findings of fish bone analysis with the data of historical sources, valuable information about the consumption of fish in the Lower Castle of Vilnius in the period from the 14th to the 17th century was obtained. As attested by the analysis, the most commonly eaten species of fish in the period from the 14th to the 17th century was pike, followed by different cyprinids. Admittedly, the species composition of the analysed fish remains was affected by the technique of hand collection of bones, as the soil was not sieved. Most probably, because of that no remains of fish with small bones, such as herring, were found, even though the species was often mentioned in historical sources. It has to be emphasized that part of the bones collected on the site by sieving belonged to small fish, and such bones were not found when collecting by hand. Therefore, the fact that large specimens of different species prevailed in the analysed collection should be related not only to the exclusive history of the historical site and its upper class residents, but also to the excavation/collection techniques. In the Lower Castle, two common carp bones were found, the only ones so far found in Lithuania, one of them dating back to the late 14th–15th century. Although that indicated that the common carps reached Vilnius fairly early, their breeding there at the time was unlikely. Historical data and the fact

that no remains of relatively large marine fish, i.e. cod, were found, suggested the absence of cod consumption tradition, at least in Vilnius, during the period in question.

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ARHEO-IHTŪOLOOGILINE JA AJALOOLINE ANDMESTIK KALADE TARBIMISEST VILNIUSE ALLKINDLUSES 14.–17. SAJANDIL

Resümee

Kalade tarbimisest kesk- ja varausaja Leedus pole senini ühtki zooarheoloogilist või ajaloolist uurimust läbi viidud. Sel perioodil kinnistusid Leedus kristlikud traditsioonid, mistõttu võib arvata, et kala oli inimeste toidus väga oluline, seda eriti kohaliku eliidi hulgas. Vilniuse allkindlus (jn 1) on üks hinnalisemaid ja ulatuslikumalt uuritud kesk- ning varausaja paiku Leedus. Arheoloogilised uuringud algasid seal juba 1988. aastal ja jätkusid kuni 2015. aastani. Nagu väljakaevamistel selgus, oli kindluse ala asustatud enam kui 700 aasta jooksul.

Selle tulemusena moodustus 7–8 m paksune kultuurikiht, milles kõrge pinnasevee taseme ja muude asjaolude tõttu olid säilinud isegi muidu kiiresti lagunevad orgaanilised materjalid. Kindluse arheoloogilistel väljakaevamistel koguti ligikaudu 80 000 loomaluud, nende seas 331 (500 g) kalaluud, mis kõik pärinevad peamiselt 14.–18. sajandist.

14.–15. sajandi kihtidest leiti 202 kalaluude fragmenti (347 g). Need luud pärinevad 11 magevee- või siirdekala liigilt. Kalade liigiline koosseis on esitatud tabelis 1 ja joonisel 2. Haugide (*Esox lucius*) kerepikkused varieeruvad 45–50 sentimeetrist kuni ligikaudu 100–110 sentimeetrini, samas pärineb suurem osa haugiluudest vahepealsetelt isenditelt, s.o 60–80 cm pikkustelt kaladelt (jn 3). Kohad (*Sander lucioperca*) olid samuti suured: 71,5% nende luudest kuuluvad 60–90-sentimeetristele isenditele.

16.–17. sajandi kihtidest koguti 88 kalaluud (83 g). Need pärinevad 9 magevee- või siirdekala liigilt (vt tabel 1 ja jn 2). Kalade suurused olid sarnased eelmise perioodi materjaliga: haugid olid 20 kuni 110 cm pikad, enamik jäi siiski vahemikku 50 kuni 80 cm (jn 3); kohade kerepikkused jäid keskmiselt 60 ja 70 cm vahele. Karpkalaliste (*Cyprinidae*) pikkused varieerusid 30-st 55 sentimeetrini, kusjuures domineerisid 40- kuni 50-sentimeetrised isendid: erandiks on siin vaid üks karpkala (*Cyprinus carpio*) lõpusekaaneluu, mis pärineb väga suurelt, 80–90 cm pikkuselt isendilt.

Vilniuse allkindlusest leitud kalaluude liigiline koosseis on sarnane ajaloolistes allikates avaldatuga, mille järgi hertsogi õukonnale ja tõenäoliselt kogu eliidile meeldisid mageveekalad, eriti haug. Sealt leitud materjali analüüsides ei tuvastatud ei tursa, heeringa ega teiste merekalade luid. Tänapäeva Leedu territooriumilt on seni üldse teada vaid üks keskaegne tursa selgrootüüli. See leiti endisest Teutooni ordu kindlusest Klaipeðast (Memelburgist) ja dateeriti 13.–14. sajandiga. Ajaloolistes allikates pole samuti märgat, et Leedu Suurhertsogiriigis oleks kunagi turska söödud. Teise väga levinud merekala – heeringa – jäänuseid pole allkindluse materjalist küll leitud, kuna luude kogumine kaevamiste ajal toimus käsitsi ja ilma tihedaid sõelu kasutamata, kuid ajaloolised allikad viitavad siiski heeringasöömisele ka allkindluses.

Suure tõenäosusega on määratud kalajäänuste koosseis mõjutatud luude käsitsi kogumisest, kuna pinnast enamasti ei sõelutud. Siinkohal tuleb märkida, et väike osa kalaluud, mis koguti pinnast sõeludes, pärineb just väiksematelt kaladelt ja selliseid käsitsi kogutud materjali hulgas ei leidunud. Seepärast tuleb teatava ettevaatlikkusega suhtuda luuleidude suuruse põhjal tehtud interpretatsioon: erinevate kalaliikide suurte isendite domineerimine kõrgklassi eksklusiivse ajalooa paigas võib tuleneda muuhulgas kaevamis- ning kogumistehnikast. Allkindlusest leiti Leedu seni ainukesed kaks arheoloogilist karpkalaluud, millest üks dateeriti 14.–15. sajandiga. Kuigi see viitab karpkala üsna varajasele jõudmisele Leetu, on selle liigi kohapeal kasvatamine üsna ebatõenäoline. Ajaloolised andmed ja fakt, et suurte merekalade, näiteks tursa luid materjalid ei leidu, lubavad arvata, et tursasöömise traditsioon Leedus puudus. Vähemalt oli see nii kesk- ja varauusaegses Vilniuses.