

RESEARCH TRADITION AND THE ARCHAEOLOGICAL RECONSTRUCTION OF FISHING IN THE SMALL HUNGARIAN PLAIN

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The outskirts of the city of Győr represent a region distinguished by its long archaeological research tradition in the Small Hungarian Plain, Western Hungary. The fertile Danube floodplain and areas frequently inundated by the river's tributaries were inhabited at all times, leading to the development of an archaeological heritage whose significance points beyond the region. Systematic archaeological research began here in the mid-20th century. Investigations have gained special momentum thanks to preventive excavations preceding the construction of the M1 motorway during the last decade of the past century. Such large-surface projects required the development of new sampling strategies which could be implemented during the course of the 2009–2011 rescue work carried out at Győr-Ménfőcsanak-Széles-földek in relation to construction activity. Thanks to fine recovery techniques, among others, fish remains could also be studied complementing other environmental archaeological analyses at the site.

INTRODUCTION

Today the once independent village of Ménfőcsanak is a southwestern suburb of Győr, a major city in western Hungary on the right bank of the Danube in the Small Hungarian Plain. The archaeological site of Széles-földek occupies the sand banks in the former beds of the Holt-Marcál and Ős-Rába rivers, south-west of the city. The settlement complex under discussion here falls within the 150-hectare area covered by archaeological sites. Archaeological activity at this set of ancient settlements has been continuous for over half a century. Field work since 1967 is summarized in *Fig. 1*.

The area under discussion here is divided by the westward pointing, rectangular elbow in the Pándzsa stream bed. The western section is lower (current altitude 113.3 m asl), while there is an elevation in the eastern part (116.2 m asl). The 19th century regulations of the Marcál and

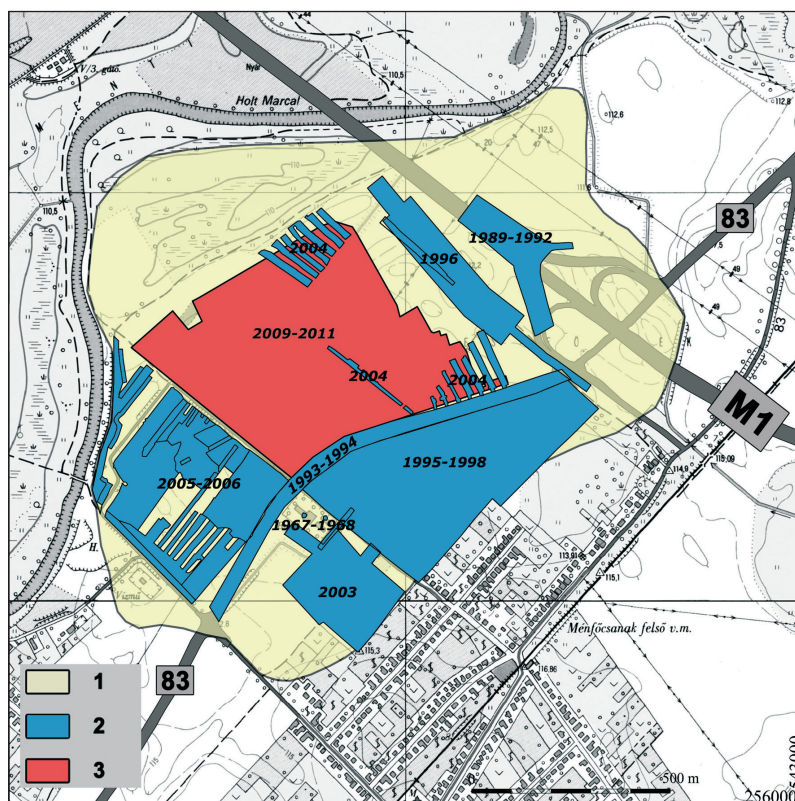


Figure 1: The location of excavations carried out since 1967 (2) in the area of the site (1) and the 2009–2011 excavation area under discussion in this article (3) (Compiled by István Eke)

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Figure 2: Swan swimming in the seasonally inundated section of the Ménfőcsanak excavation (Photo Ferenc Halász, 2011)

Rába rivers as well as of the Pándzsa stream during the 20th century have not changed this dual division. Field observations made during the excavation showed that following extensive rainfall, deeper sections of the archaeological site became inundated. The extent of this water cover is illustrated by the presence of a swan in the seasonal pond (Fig. 2). Temporary water cover in the area resulted even in the occurrence of minor fish, including small Cyprinids (Fig. 3).



Figure 3: Small Cyprinid fish (crucian carp?) in the stagnant water of the Ménfőcsanak site (Photo Ferenc Halász, 2011)

RESEARCH HISTORY

The first settlement section assigned to the Middle *Neolithic* Transdanubian Linearband culture was excavated by Sándor Mithay at the site of Győr-Pápai vám, less than 1 km from Széles-földek in 1952 and 1954. It was dominated by Zseliz-type pottery,⁴ represented only in traces at Széles-földek.

Copper Age research in this region gained momentum due to excavations during 1989–1995 preceding the construction of the M1 motorway, including excavations directed by Gabriella Németh (Lébény-Billedomb, Lébény-Kaszás-domb),⁵ Ildikó Egry (Mosonszentmiklós-Egyéni földek, Győr-Marcalváros-be-

⁴ Mithay, Sándor: Zselizi típusú leletek a Győr, Pápai vámi újabb-kőkori lakótelepen (Zseliz-type finds at the new stone age settlement site Győr-Pápai vám). *Arrabona* 8 (1966), 5–52.

⁵ Németh T., Gabriella: Vorbericht über spätneolithische und frühkupferzeitliche Siedlungsspuren bei Lébény, Westungarn. *Jósa András Múzeum Évkönyve XXXV* (1994), 241–261.

vásárlóközpont, Ménfőcsanak-bevásárlóközpont),⁶ and András Figler (Börcs-Paphomlok-dűlő,⁷ Abda-Hármasok). Almost all of these yielded houses of dual division with foundation ditches, typical of the Lengyel III as well as the subsequent Balaton-Lasinja cultures and the so-called Ludanice group.

So far Győr-Szabadrét-domb has yielded the only Middle Copper Age radiocarbon dates in the region (3360–2934±60 cal BC).⁸ While the archeological material from this site is unpublished, the analysis of fish bones is the first such work ever carried out in the Small Hungarian Plain,⁹ a direct antecedent to the results presented here.

The only monographic analysis of *Bronze Age* sites in the area was written by Sándor Mithay.¹⁰ Subsequent cemetery analyses by András Uzsoki¹¹ and work by András Figler and his co-authors include both syntheses and smaller contributions to Bronze Age archaeology.¹² Special research is represented by the excavation of Bronze Age wells (Mosonmagyaróvár, Lébény)¹³ and the analysis of an early Tumulus culture vessel deposit recovered at Hegykő.¹⁴ Finally, a monographic treatise of the Lime Incrusted Ware culture by Viktória Kiss including the site under discussion here needs to be mentioned.¹⁵

Beginning in 1887, *Hallstatt culture* research in the broader region has focused on the figural urns from the tumuli of Sopron-Váris-hegy (Károly heights) and Sopron-Burgstall.¹⁶ Additional burial mounds and the fortified settlement of Burgstall also attracted well-deserved attention.¹⁷ This picture has been enriched

⁶ M. Egry, Ildikó: Javaréz kori település nyomai Ménfőcsanak határában (Traces of a mature Copper Age settlement in the outskirts of Ménfőcsanak). *Arrabona* 37 (1999), 11–63; M. Egry, Ildikó: Beszámoló a Győr–Marcalváros, Bevásárlóközpont területén végzett megelőző régészeti feltárásokról (Report on the preventive excavations carried out at Győr–Marcalváros, Bevásárlóközpont). *Arrabona* 39 (2001), 57–78.

⁷ Figler, András: Börcs–Paphomlokdűlő (M-1 Börcsi pihenő). *Régészeti Füzetek* 46 (1994), 7.

⁸ Figler, András – Bartosiewicz, László – Fülek, György – Hertelendi, Ede: Copper Age settlement and the Danube water system: a case study from north-western Hungary. In: *Landscapes in Flux. Central and Eastern Europe in Antiquity*, Colloquia Pontica 3, ed. Chapman, John – Dolukhanov, Pavel (Oxford: Oxbow Books, 1997), 212, Table 2.

⁹ Bartosiewicz, László – Hertelendi, Ede – Figler, András: Seasonal dating of hand-collected fish remains from a prehistoric settlement in Hungary. In: *Fish Exploitation in the Past: Proceedings of the 7th Meeting of the ICAZ Fish Remains Working Group*, ed. Van Neer, Wim (Tervuren: Koninklijk Museum voor Midden-Afrika) *Annalen, Zoologische Wetenschappen* 274 (1994), 107–114.

¹⁰ Mithay, Sándor: *Bronzkori kultúrák Győr környékén* (Bronze Age cultures around Győr) (Győr: Pósa Tamás Nyomdai Műintézete, 1941).

¹¹ Uzsoki, András: Bronzkori temető Mosonszentmiklós–Jánosházpusztán (Bronze-age cemetery at Mosonszentmiklós–Jánosházpuszta). *Arrabona* 5 (1963), 5–89.

¹² Figler, András: Adatok Győr környékének bronzkorához. Bronzkori kultúrák Győr környékén (Angaben zur Bronzezeit in der Umgebung von Győr. Bronzezeitliche Kulturen in der Umgebung von Győr). *Acta Musei Papensis – Pápai Múzeumi Értesítő* 6 (1996), 7–29; Nagy, Marcella – Figler, András: Dentáliumékszerek a Gáta-Wieselburg kultúra temetkezéseiben (Dentalium jewellery in the Gáta-Wieselburg culture burials). In: *ΜΩΜΟΣ VI. Óskoros kutatók VI. összejövetelének konferenciakötete. Nyersanyagok és kereskedelem. Kőszeg, 2009. március 19–21.*, ed. Ilon, Gábor (Szombathely: Vas megyei Múzeumok Igazgatósága, 2009), 255–266.

¹³ Grynaeus, András: A Mosonmagyaróvár–Német dűlőben feltárt bronzkori kút dendrokronológiai vizsgálata (Dendrochronological investigation of the Bronze-age well excavated at Mosonmagyaróvár–Német dűlő). *Savaria Pars Archaeologica* 24/3 (1999), 73–81; Németh, T. Gabriella – Takács, Miklós: Urzeitliche und mittelalterliche Brunnen bei Lébény. *Antaeus* 26 (2003), 97–139.

¹⁴ Ilon, Gábor: A bronzkori halomsíros kultúra temetkezései Nagydém–Középrépusztán és a hegykői edénydepot (Burials of the Bronze-age Tumulus culture at Nagydém–Középrépuszta and the pottery depot at Hegykő). *Savaria Pars Archaeologica* 24/3 (1999), 239–276.

¹⁵ Kiss, Viktória: *Middle Bronze Age Encrusted Pottery in Western Hungary* (Budapest: Varia Archaeologica Hungarica 27, 2012).

¹⁶ Eibner-Persey, Alexandrine: Hallstattzeitliche Grabhügel von Sopron (Ödenburg). In: *Die Funde der Grabungen 1890–92 in der Prähistorischen Abteilung des Naturhistorischen Museums in Wien und im Burgenlandischer Landesmuseum in Eisenstadt* (Eisenstadt: Wissenschaftliche Arbeiten aus dem Burgenland 62, 1980).

¹⁷ Patek, Erzsébet: Neue Untersuchungen auf dem Burgstall bei Sopron. *Bericht der Römisch-Germanischen Kommission* 63 (1982), 106–177; Patek, Erzsébet: *Westungarn in der Hallstattzeit* (Weinheim: Acta Humaniora, Quellen und Forschungen zur prähistorischen und provinzialrömischen Archäologie 7, 1993).

by excavations at Sopron-Krautacker by Erzsébet Jerem.¹⁸ An extremely important aspect of this project was the first ever comprehensive survey in environmental history in Hungary, an initiative that continued with gathering data from the entire Small Hungarian Plain.¹⁹

In relation to the *Celtic Period*, the site of Sopron-Bécsi-domb²⁰ as well as 1987 excavations by András Uzsoki at the Celtic cemetery of Ménfőcsanak and their 21st century continuation²¹ must be mentioned along with the Celtic component of Sopron-Krautacker investigated by Erzsébet Jerem.²²

In light of these antecedents it is unsurprising that excavations preceded the construction of a shopping mall at Széles-földek by the archaeologists of the Region 2 Chapter of the National Heritage Centre of the Hungarian National Museum in Szombathely, directed by Gábor Ilon.

A total of 277,165 m² were investigated between October 2009 and September 2011, in which 11,505 features were uncovered, 80% representing Celtic and Roman Period settlements. Find material filled 1255 standard M30 boxes (595×395×300 mm). The material was carried to the Szombathely office for cleaning and conservation, accomplished by December 2012. Following the dissolution of the Cultural Heritage Service, the finds were shipped to the facilities of the Hungarian National Museum in Budapest in February 2014.

Recent findings from Ménfőcsanak-Széles-földek include the evaluation of Kisapostag and early Lime Incrusted Ware cultures by Eszter Melis. She has also studied the so-called Tokod group, as well as settlement fragments and burials of the Gáta–Wieselburg culture.²³ The settlement found in relation to graves of

¹⁸ Jerem, Erzsébet: Zur Ethnogenese der Ostkelten – Späthallstatt- und frühlatènezeitliche Dräberfelder zwischen Traisental und Donauknie. In: *Die Kelten in den Alpen und an der Donau. Akten des Int. Symp. St. Pölten, 14.–18. Oktober 1992*, ed. Jerem, Erzsébet – Krenn-Leeb, Alexandra – Neugebauer, Johannes-Wolfgang – Urban, Otto H., (Budapest–Wien: Archaeolingua, 1996), 91–110; Schweltnus, Franka: Die Siedlung von Sopron–Krautacker (Westungarn) in der späten Hallstatt- und frühen Latènezeit. *Archäologisches Korrespondenzblatt* 41/3 (2011), 359–373.

¹⁹ Jerem, Erzsébet: Zur Ethnogenese der Ostkelten – Späthallstatt- und frühlatènezeitliche Dräberfelder zwischen Traisental und Donauknie. In: *Die Kelten in den Alpen und an der Donau. Akten des Int. Symp. St. Pölten, 14.–18. Oktober 1992*, ed. Jerem, Erzsébet – Krenn-Leeb, Alexandra – Neugebauer, Johannes-Wolfgang – Urban, Otto H., (Budapest–Wien: Archaeolingua, 1996), 91–110; Németh, T. Gabriella: Angaben zur hallstattzeitlichen Topographie des südlichen Teils der Kleinen Tiefebene. In: *Die Osthallstattkultur. Akten des Internationalen Symposiums, Sopron 10–14 Mai 1994*, ed. Jerem, Erzsébet – Lippert, Andreas (Budapest: Archaeolingua, 1996), 365–379; Đurkovič, Éva: A Kisalföld kora vaskori kapcsolatainak kérdése néhány fibulátípus tükrében (Early Iron Age relations of the Kisalföld in the light of some fibula types). In: *ΜΩΜΟΣ VI. Őskoros kutatók VI. összjevitelének konferenciakötete. Nyersanyagok és kereskedelem. Kőszeg, 2009. március 19–21.*, ed. Ilon, Gábor (Szombathely: Vas megyei Múzeumok Igazgatósága, 2009), 17–33; Đurkovič, Éva: Kora vaskori topográfiai kutatások a Kisalföldön (Early Iron Age topographical research in the Kisalföld). *Ősrégészeti Levelek – Praehistoric Newsletter* 11 (2009), 95–113.

²⁰ Márton, Lajos: A korai La Tène-sírok leletanyaga. *Dolgozatok* 9–10 (1933–34), 93–165.

²¹ Uzsoki, András: Ménfőcsanak. In: *Corpus of Celtic Finds in Hungary. Transdanubia I*, ed. Kovács, Tibor – Petres, Éva – Szabó, Miklós (Budapest: Akadémiai kiadó, 1987), 13–61; Vaday, Andrea: The chronological model of the Celtic cemetery of Ménfőcsanak. In: *Thracians and Celts. Proceedings of the International Colloquium from Bistriga 18-20 May 2006*, ed. Sârbu, Valeriu – Vaida, Dan Lucian (Cluj-Napoca: Editura Mega, 2006), 279–294; Egry, Ildikó: Előzetes beszámoló Győr–Ménfőcsanak, Eperföldeken végzett megelőző feltárásról (Preliminary report on the investment-led excavation at Győr–Ménfőcsanak Eperföldek, 2005–2006). In: *Régészeti Kutatások Magyarországon – Archaeological Investigations in Hungary*, ed. Kisfaludi, J. (Budapest: Kulturális Örökségvédelmi Hivatal – Magyar Nemzeti Múzeum, 2007), 27–52.

²² Jerem, Erzsébet: Zur Ethnogenese der Ostkelten – Späthallstatt- und frühlatènezeitliche Dräberfelder zwischen Traisental und Donauknie. In: *Die Kelten in den Alpen und an der Donau. Akten des Int. Symp. St. Pölten, 14.–18. Oktober 1992*, ed. Jerem, Erzsébet – Krenn-Leeb, Alexandra – Neugebauer, Johannes-Wolfgang – Urban, Otto H., (Budapest–Wien: Archaeolingua, 1996), 91–110.

²³ Melis, Eszter: Adatok a Tokod-csoport nyugati elterjedéséhez (Data to the spread of the Tokod group). *Arrabona* 49 (2011), 179–200; Melis, Eszter: Data on Early Bronze Age Apparel on the Basis of a Cremation Grave Excavated at Ménfőcsanak–Széles-földek. *Hungarian Archaeology*, Autumn 2013. Accessed: 2016.04.16.; Melis, Eszter: A ménfőcsanaki középső bronzkori település nyugati típusú leletgyűjtései (Western-type find assemblages of the middle Bronze Age settlement at Ménfőcsanak). *Communicationes Archaeologicae Hungariae* (2014), 37–69.

the early Tumulus culture²⁴ yielded a sacrificial pit (dated to around 1500 cal BC) analysed by Gábor Ilon.²⁵ The first ever series of Hallstatt radiocarbon dates (770–400 cal BC) was published by Éva Ďurkovič.²⁶ The Celtic settlement covering several hectares at the site was discussed in studies by Károly Tankó.²⁷

The analysis of several rarely discovered Roman wells with wooden lining also deserves mention.²⁸ Successful archaeobotanical and malacological studies have already been carried out at this site.²⁹ An archaeozoological publication from the site concerned insect remains recovered from a Roman Period well.³⁰ The analysis of human remains from Ménfőcsanak is also underway.³¹ However, studies dealing with vertebrate remains are yet to be published. Moreover, fish scale studies by Alfred Galik, complementing the analysis of fish bones in this study, represent the first such analysis in Hungary.

MATERIAL AND METHODS

During the course of fieldwork 145 M30 (595×395×300 mm) standard size boxes of soil samples were gathered, of which 82 contained vertebrate remains. On average, each sample contained three fish bones (249/82=3; *Table 1*).

- ²⁴ Kovács, Tibor: Das Grab von Ménfőcsanak. Ein Beitrag zu transdanubischen Denkmälern der Vorhügelgräberzeit. In: *Xpóvoç – Festschrift für Bernhard Hänsel. Beiträge zur prähistorischen Archäologie zwischen Nord- und Südosteuropa*, ed. Dobiat, Claus – Leidorf, Klaus (Espelkamp: Studia honoraria 1, 1997), 297–301; M. Egry, Ildikó: Halomsíros temető Győr–Ménfőcsanak–Bevásárlóközpont területén (Tumulus cemetery at Győr–Ménfőcsanak–Bevásárlóközpont). In: *ΜΩΜΟΣ VI. Őskoros kutatók III. összejövetelének konferenciakötete. Halottkultusz és temetkezés. Kőszeg, 2009. március 19–21.* (Proceedings of the 3rd meeting for the researchers of prehistory. Dead cult and burials), ed. Ilon, Gábor (Szombathely: Vas megyei Múzeumok Igazgatósága, 2004), 121–137.
- ²⁵ Ilon, Gábor: Opfergrube der Hügelgräberkultur in der Gemarkung von Ménfőcsanak. Spiralornament auf einem Tonfries eines Gebäudes. *Acta Archaeologica Academiae Scientiarum Hungaricae* 65 (2014), 5–42.
- ²⁶ Ďurkovič, Éva: Weaving-related finds from the Early Iron Age settlement at Győr–Ménfőcsanak (Hungary). In: *An der Grenze der Bronze- und Eisenzeit. Festschrift für Tibor Kemenczei zum 75. Geburtstag*, ed. Ilon, Gábor – Szathmári, Ildikó (Budapest: Magyar Nemzeti Múzeum, 2015), 81–107.
- ²⁷ Tankó, Károly: Rekonstruktion eines latènezeitlichen Grubenhaus aus Ménfőcsanak–Szeles (B83). *Communicationes Archaeologicae Hungariae* (2004), 105–112; Tankó, Károly – M. Egry, Ildikó: Kelta település Győr–Ménfőcsanak–Bevásárlóközpont területén. Az 1995. és 2006. évi ásátás (Celtic settlement excavations at Győr–Ménfőcsanak–Bevásárlóközpont (Hypermarket) between 1995 and 2006). In: *ΜΩΜΟΣ VI. Őskoros kutatók VI. összejövetelének konferenciakötete. Nyersanyagok és kereskedelem. Kőszeg, 2009. március 19–21.* (Proceedings of the 6th meeting for the researchers of prehistory. Raw materials and trade), ed. Ilon, Gábor (Szombathely: Vas megyei Múzeumok Igazgatósága, 2009), 401–416; Tankó, Károly: Late Iron Age settlement in the vicinity of Ménfőcsanak (Road no. 83. and Bevásárlóközpont). In: *Studia Celtica Classica et Romana Nicolae Szabó septuagesimo dedicata*, ed. Borhy, László (Budapest: Pytheas, 2010), 249–260.
- ²⁸ Vaday, Andrea: Wells excavated in the Carpathian basin during a decade. *Antaeus* 26 (2003), 25–68.
- ²⁹ Kreiter, Attila – Pető, Ákos (eds.): *Összesített kutatási jelentés a Győr–Ménfőcsanak, Széles-földek lelőhelyen (KÖH: 34305) felvett talajszelvények talajtani, geokémiai, archaeobotanikai és malakológiai adatairól* (Budapest: Magyar Nemzeti Múzeum Nemzeti Örökségvédelmi Központ Restaurálási és Alkalmazott Természettudományi Laboratórium, 2012); Pető, Ákos – Kenéz, Árpád – Baklanov, Szandra – Ilon, Gábor: Integrált archaeobotanikai vizsgálatokra alapozott objektumon belüli térhasználat-elemzés: módszertani esettanulmány Győr–Ménfőcsanak Széles-földek lelőhelyéről (Spatial analysis of the use of inner space based on integrated archaeobotanical analyses: A methodological case study from Győr–Ménfőcsanak Széles-földek archaeological site). *Archeometriai Műhely* (2012)/3, 173–204; Kenéz, Árpád – Malatinszky, Ákos – Pető, Ákos: The first archaeobotanical evidence of *Dasyphyrum villosum* in Hungary: an archaeophyte weed or a native grass? *Vegetation History and Archaeobotany* 23 (2014), 841–849.
- ³⁰ Merkl, Ottó – Ilon, Gábor: Rovarmaradvány egy római kori kútból Ménfőcsanak–Széles-földekről (Insect remains found in a Roman Age well located in the Lands of Ménfőcsanak–Széles-Földek). *Archeometriai Műhely* (2012)/1, 53–56.
- ³¹ Tóth, Gábor – Tokai, Zita Mária: Győr – Ménfőcsanak rézkori temetkezései (Embentani eredmények) (Copper-age burials at Győr–Ménfőcsanak [Anthropological results]). In: *A Nyugat Magyarországi Egyetem Savaria Egyetemi Központ tudományos közleményei XXI. Természettudományok* 16 (Szombathely, 2016), 203–220; Tóth, Gábor – Melis, Eszter – Ilon, Gábor: A ménfőcsanaki feltárás (2009–2011) bronzkori leletanyagának embentani és azokkal összefüggő régészeti eredményei (Anthropological and related archaeological results of the Bronze-age find material from the Ménfőcsanak exploration [2009–2011]). In: *Beatus homo qui invenit Sapientiam: Ünnepi kötet Tomka Péter 75. születésnapjára*, ed. Csécs, Teréz – Takács, Miklós (Győr: Lekri Group Kft. 2016), 737–755.

Table 1: The chronological distribution of fish bones by feature types

	House	Pit	Well	Total
Neolithic Linearband (Zseliz)		1		1
Middle Bronze Age (Lime incrustated ware)		18		18
Late Bronze Age		2		2
Late Bronze Age (Tumulus culture)		15		15
Late Bronze Age/Iron Age		4		4
Early Iron Age	7	17		24
Celtic	98	8		106
Celtic/Roman	2			2
Roman	13	24	5	42
Avar		14		14
Non-dated		21		21
Total	120	124	5	249

The collection of small vertebrate remains requires specialized sampling techniques, flotation, and water-sieving, as the majority of these small remains remain invisible during the hand collection of archaeological finds. In Fig. 4, emphasis is given to Bronze Age samples which could be first evaluated during the analysis. The remaining 20 by 20 m squares provided mostly Celtic and Roman Period finds. Among the latter, squares yielding sporadic remains of small fish are distinguished from those that offered evidence of prehistoric active fishing in the form of bones originating from large fish bones.

Species identification based on the analysis such samples offers information on the presence vs absence of species. The quantity and dietary contribution of fish are far more difficult to appraise on the basis of direct but sporadic evidence. A special question is posed by the dilemma whether the fish remains represent natural accumulations or result from human activity. In areas characterized by dynamic fluvial activity – such as the Danube and Rába floodplains and their network of tributaries – one must always reckon with fish that died natural deaths in residual flood pools in seasonally inundated low-lying sections of settlements.

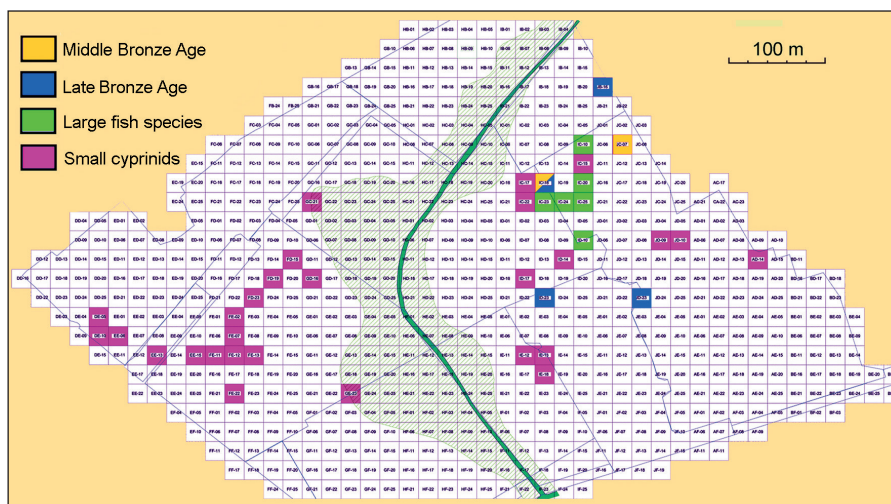


Figure 4: The location of 20 by 20 m squares sampled for fish bones in the excavated area. Explanation in text (Base map: István Eke)

Fish bone measurements can be used in estimating the life size of individuals. Although relatively few measurable specimens were recovered, those permitted measurement following the protocol by Morales and Rosenlund.³² The greatest lengths of prehistoric pike were reconstructed using contemporary reference skeletons.³³

ZOOLOGICAL EVALUATION

When reviewing the identifiable fish taxa, first the remains of large-bodied species in the sturgeon family (Acipenseridae) are worth discussing (Table 2). The porous bones of cartilaginous fish in this family tend to be poorly preserved. Species level identification is also often hampered by individual variability. On the other hand, considering the usually large size of these fish, especially great sturgeon (e.g. in Str. 7103, Linearband culture), their remains tend to indicate active fishing.

Table 2: The chronological distribution of fish bones by taxa

	Sturgeon family (Acipenseridae)	Great sturgeon (<i>Huso huso</i> Brandt, 1869)	Pike (<i>Esox lucius</i> L., 1758)	Pikeperch (<i>Sander lucioperca</i> L., 1758)	Carp (<i>Cyprinus carpio</i> L., 1758)	Tench (<i>Tinca tinca</i> L., 1758)	Silver bream (<i>Blicca bjoerkna</i> L., 1758)	Roach (<i>Rutilus rutilus</i> L., 1758)	Carpfish, large (Cyprinidae)	Carpfish, small (Cyprinidae)	Fish indet (Pisces)	Total
Neolithic Linearband (Zseliz)		1										1
Middle Bronze Age (Lime incrustated ware)				2	6	1	1		1	1	6	18
Late Bronze Age											2	2
Late Bronze Age (Tumulus culture)			12		1						2	15
Late Bronze Age/Iron Age		2		1	1							4
Early Iron Age	6	1	1		4			1	2	4	5	24
Celtic			1		1					28	76	106
Celtic/Roman					1						1	2
Roman	2		7							4	29	42
Avar			2							4	8	14
Non-dated			1		2					11	7	21
Total	8	4	24	3	16	1	1	1	3	52	136	249

³² Morales, Arturo – Rosenlund, Knud: *Fish bone measurements. An attempt to standardize the measuring of fish bones from archaeological sites* (Copenhagen: Steenstrupia, 1979).

³³ Bartosiewicz, László: Osteometrical studies on the skeleton of pike (*Esox lucius* L. 1758). *Aquacultura Hungarica* VI (1990), 25–34.

In this material, the remains of pike carry the most information. The majority were brought to light from a Late Bronze Age Tumulus culture sacrificial pit (Str. 7765) attributed to the Urn Field culture and Roman Period strata (Fig. 5). Their numbers hardly exceed a dozen, and it is possible that eight of the bones originate from the same individual as is the case with a pair of Roman Period palatal bones that belonged to a ca. 50 cm long pike.

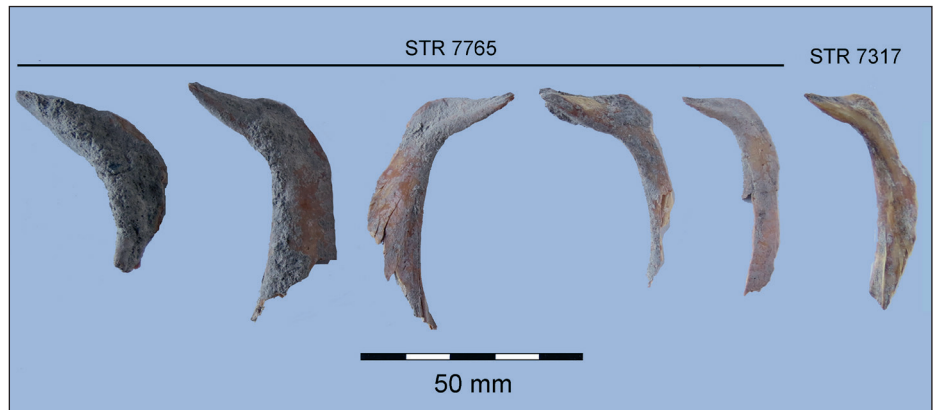


Figure 5: Fragmented pike cleithra from the Tumulus culture sacrificial pit (Str. 7765) in comparison with the same but complete bone of a ca. 55 cm long individual recovered from the Iron Age House, Str. 7317

An Iron Age building (Ha C-D1: Str. 7317) yielded a complete pike cleithrum whose chord length (cl. c. l.) was 52.1 mm. It is indicative of a likewise smallish individual of ca. 55 cm greatest length. This bone, however, is very important in assessing the size of fragments from larger but non-measurable cleithra. They suggest that pikes in the Tumulus culture sacrificial pit (Str. 7765) were significantly longer than 55 cm.

In general, fishing for pike actively would rather mean angling or the use of harpoons as pike are usually solitary animals. In spite of its remarkably small size, a Celtic-period pike caudal vertebra is of special interest. Remains of this low size range, hardly exceeding a hand in length, came to light from water-sieved samples gathered at early Neolithic Ecsegfalva 23B in the Great Hungarian Plain. The question was thus raised whether they may have originated from fish trapping or “potting”. The latter method means gathering small fish encircled in large, bottomless baskets in shallow, residual flood pools. A dentale and an urohyal bone from pikeperch from Str. 212 represent the early Middle Bronze Age (*Litzenkeramik* style).

Common carp, represented by the second greatest number of bones among the six identified species, is the largest cyprinid. It is followed by tench, silver bream, and roach at this site. These small species form a standard part of pike diets. Bones of the largest species, carp may be identified on the basis of size³⁴ as it may reach one metre in length, exceeding those of tench, crucian carp, etc. whose lengths vary between 0.1–0.6 m.³⁵ Cyprinids are characterized by great similarities in skeletal morphology. It is the diverse and resistant pharyngeal teeth that can be best identified. These small elements, however, were rare in our find material. The fragment of a large cleithrum was attributed to carp on the basis of size. Tench is typical of stagnant waters, requiring the smallest dissolved oxygen content among the fish identified at Ménfőcsanak. It is therefore characteristic of hydrological conditions at Széles-földek.

Even the 133 non-identifiable fish bones recovered from the water-sieved samples carry information concerning the ancient environment of the site. Their majority have ended up in the archaeological samples from natural deposits. This possibility can be easily appraised in Fig. 4: occurrences of bones from large fish are marked in green in the site plan. Even today a marshy area lay west of the stream’s bed covering approximately 300–400 m². This section of the settlement could be inhabited only in extensive dry periods during prehistory. It is plausible to suggest that samples from this low-lying surface were contaminated by natural fish accumulations. Bones from large fish associated with cultural deposits may be more securely linked to fish consumption and active fishing.

³⁴ Bartosiewicz, László – Takács, István – Székelyhidy, Iván: Problems of size determination in common carp (*Cyprinus carpio*). In: *Fish exploitation in the past. Proceedings of the 7th meeting of the ICAZ Fish Remains Working Group*, ed. Van Neer, Wim (Tervuren: Annales du Musée Royal de l’Africa Centrale, Sciences Zoologiques 274, 1994), 55–60.

³⁵ Bartosiewicz, László – Bonsall, Clive: Prehistoric fishing along the Danube. *Antaeus* 27 (2004), 253–72.

Samples from 36 stratigraphic units yielded 1992 fish scales (Table 3). The numerical distribution of these finds was rather unbalanced among the numerous stratigraphic units representing various archaeological features. The majority of stratigraphic units revealed less than one percent of the total material while a few contained between 1–8% of the scale finds. Two stratigraphic units contained higher frequencies of fish finds. Str. 1213 (21%) and Str. 6490 (over 50%) revealed masses of scales.

Table 3: The chronological distribution of fish scales by taxa

	Pike (<i>Esox lucius</i> L., 1758)	Pikeperch (<i>Sander lucioperca</i> L., 1758)	Perch (<i>Perca fluviatilis</i> L., 1758)	Percid fish (Percidae)	Carp (<i>Cyprinus carpio</i> L., 1758)	Bream (<i>Abramis brama</i> L., 1758)	Carpfish (Cyprinidae)	Fish indet. (Pisces)	Total
Middle Bronze Age (Lime incrustated ware)		3						18	21
Late Bronze Age								1	1
Late Bronze Age (Tumulus culture)								5	5
Early Iron Age		2						4	6
Celtic	7	7	1	1		2	11	124	153
Celtic/Roman	11				52	1	1087	1	1152
Roman	533	3	9	1	2		6	88	642
Avar	3							6	9
Non-dated								3	3
Total	554	15	10	2	54	3	1104	250	1992

Approximately 12.6% of the scales cannot be precisely identified due to the high degree of fragmentation. Identifiable specimens represent two basic types: *cycloid* and *ctenoid* scales.³⁶ The majority (58%) fall within the group of cycloid scales, indicative mainly of cyprinids. Some large scales originate from carp. Another 27% is represented by the typically shaped trilobite cycloid scales of pike (Fig. 6: A–B). Stratigraphic complex Str. 6490/-25445, -25412, -25417 provided a large assemblage, where most scales indicate large cyprinids (Fig. 6: C). The third type consists of hard, spiny multi-lobate ctenoid scales of perch-like fishes (Percidae).

For an “exact” identification of complete Cyprinid scales, the position within the body should first be ascertained, because the shape of scales varies by anatomical location. Fish scales from archaeological sites are usually recovered as loose finds, lacking this kind of information. However, some of the cyprinid scales at this site show similarities to bream (Celtic Period Str. 1131/25672; 1170/25906; 6490/25417; Fig. 7: A). Other isolated and fragmented scales are comparable to carp scales (Str. 6343/26395; 5702/26179; 627/25143). Carp scales have a pentagonal form sometimes roundish in shape, showing little knots at the

³⁶ Benecke, Berthold: Die Schuppen unserer Fische. *Schriften der physikalisch-ökonomischen Gesellschaft zu Königsberg* 22 (1882) 112–117.

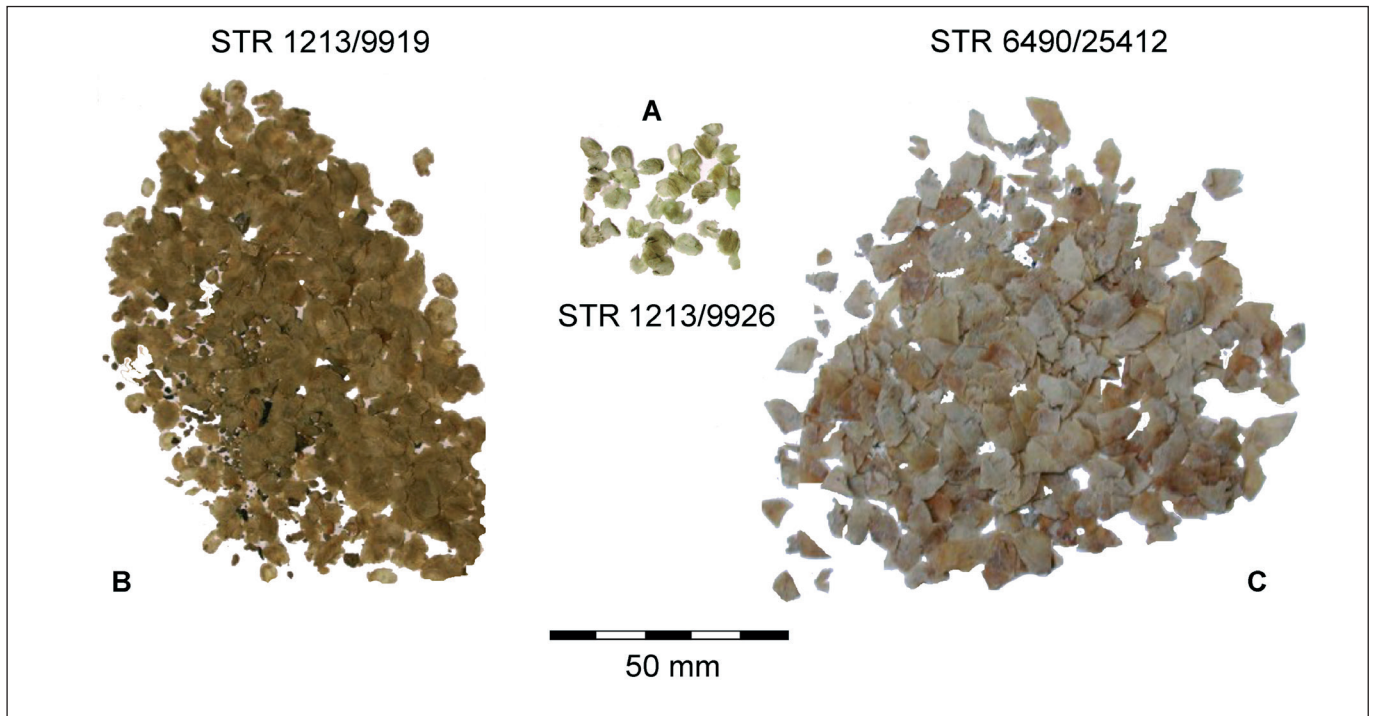


Fig. 6: A: Str. 1213/9926 trilobate pike scales; B: Str. 1213/9919 assemblage of fish scales consisting mainly of pike scales; C: Str. 6490/25412 numerous fragments of large Cyprinid scales, some of them resemble carp scales



Fig. 7: A: Str. 6490/25417 fish scale most probably bream; B: Str. 6490/25412 fish scale fragment, most probably carp

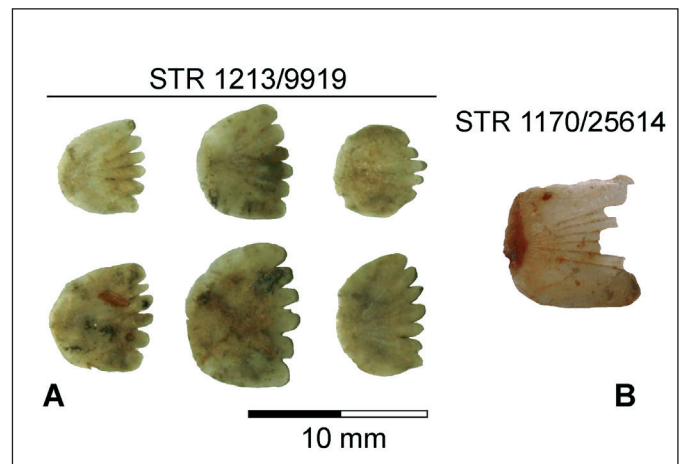


Fig. 8: A: Str. 1213/9919 scales of perch; B: Str. 1170/25814 scale of pikeperch

posterior edge (Fig. 7: B).³⁷ However, such knots might also appear on the scales of very large bream (*Abramis brama* L., 1758) and crucian carp (*Carassius carassius* L., 1758), although those are higher and sometimes even more cycloid than carp scales.

The few ctenoid scales are indicative of the presence of perch (Fig. 8: A) with its hard and solid scales including the spiny posterior part. The presence of pikeperch was also indicated by a somewhat higher number of finds. Scales of pikeperch are not as solid as those of perch, the anterior *lobi* are smaller and the *striae* project further to the anterior part (Fig. 8: B).

³⁷ Galik, Alfred: Fischreste aus mittelalterlichen bis neuzeitlichen Fundstellen: Bedeutung und Aussagekraft dieser kleinen archäozoologischen Funde. *Beiträge zur Mittelalterarchäologie in Österreich* 15 (1999), 197–206.

Although dozens of scales are attached to the body on one side of a fish, archaeological finds might mirror fishing activities and dietary habits of people. The majority of scales at this site represent cyprinids although only a fraction of those can be identified to species level with some uncertainty (Fig. 9). Pike was of more importance than perch and pikeperch, the two latter being represented by smaller numbers of identifiable scales. However, one should keep in mind the taphonomic history of these finds: only a few complexes revealed higher concentrations of finds permitting a more reliable reconstruction (Fig. 10).

Celtic Period Str. 6490 consists mainly of cyprinid scales with some potentially originating from carp, although those as well as pike scales are clearly underrepresented. Concentrations in this Str. represent probably a place where mainly Cyprinids and/or carp had been descaled and exploited. Roman Period Str. 627 and Str. 1213 reflect a different picture because they mainly consist of pike scales. These stratigraphic units may include places where mainly pike was descaled, although Str. 1213 contained some pikeperch and perch scales as well. These samples may originate from places where one or several individuals of the same species were processed and primary accumulation probably took place in a short period of time. The homogeneity and high frequency of scales may also indicate that the assemblage was buried shortly after the accumulation prior to the potential dispersal of the scales.

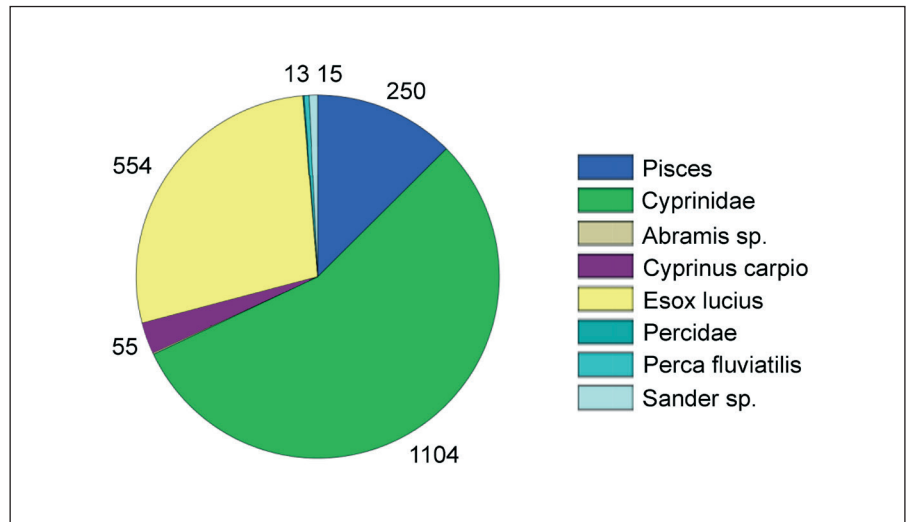


Fig. 9: Total numeric quantification of identifiable scales by fish taxa from Ménfőcsanak

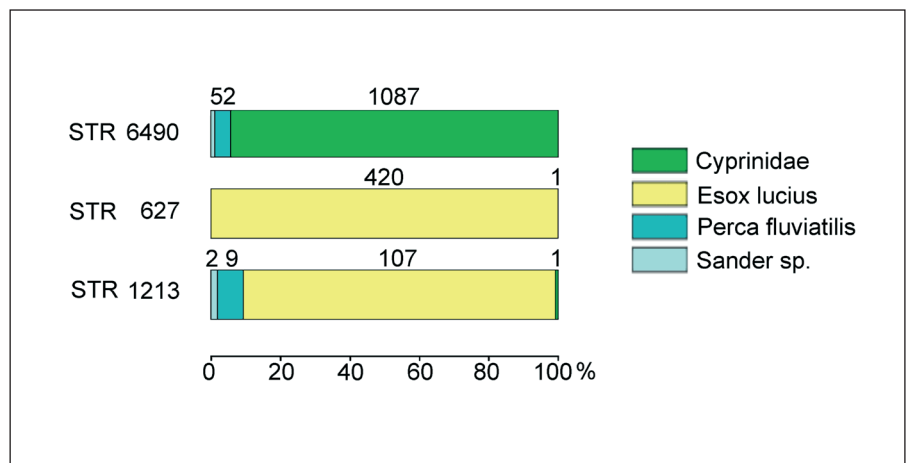


Fig. 10: Quantification of identifiable fish scales from Str. 6490, 627, and 1213 from Ménfőcsanak

DISCUSSION AND CONCLUSIONS

Water-sieved samples from the site show a constant presence of fish. It is difficult to determine, however, which remains originated from active fishing, and which should be considered natural deposits resulting from inundations in this alluvial environment. Natural and anthropogenic fish bone deposits were first systematically studied by Wim Van Neer and Arturo Morales Muñiz in their actualistic study.³⁸ Natural deposition needs to be reckoned with in this floodplain area due to dynamic fluviation and intensive sediment

³⁸ Van Neer, Wim – Morales Muñiz, Arturo: Fish middens – anthropogenic accumulations of fish remains and their bearing on archaeoichthyological analysis. *Journal of Archaeological Science* 19/6 (1992), 683–695.

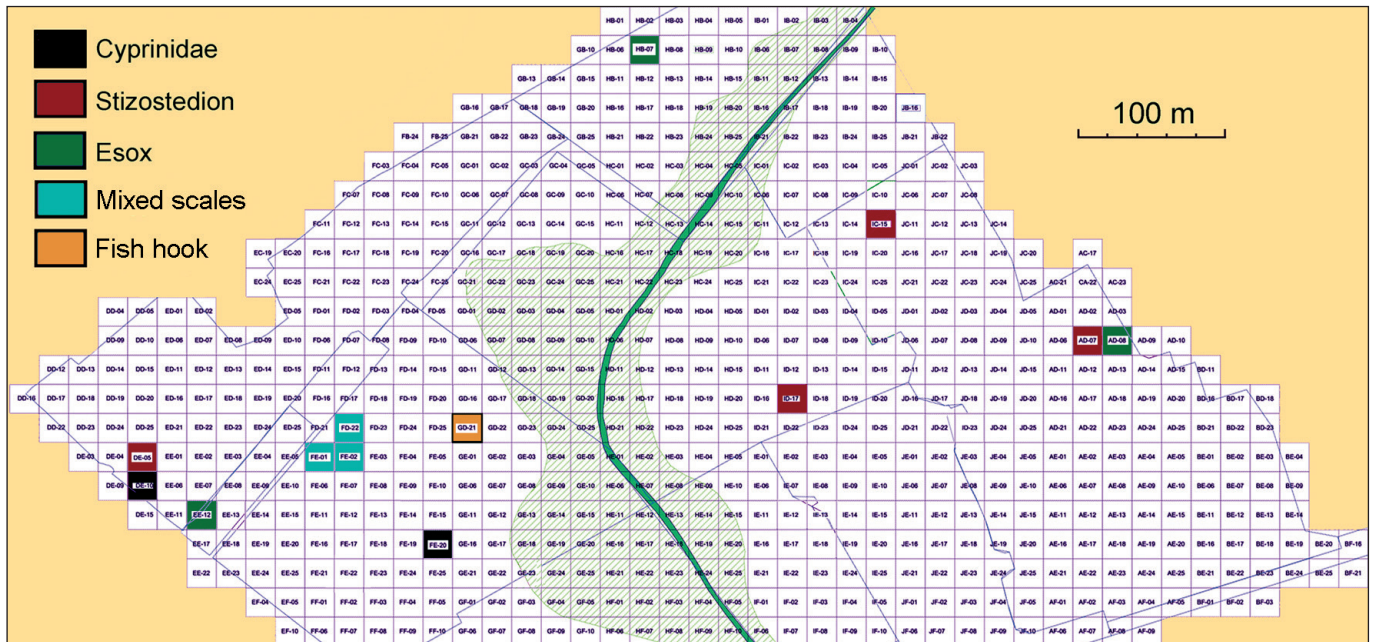


Figure 11: The distribution of major fish scale concentrations and the find spot of the metal hook found in a primary position in the excavated area

deposition.³⁹ However, the remains of grasses and cultivated cereals found at the site are indicative of the exploitation of relatively dry habitats. Inundations may have played a role in the natural deposition of bones originating from small fish of little economic importance especially west of the stream.

The bones of large carp and pike from Late Iron Age and Roman Period features in the eastern section are indicative of the dietary roles these fish must have played. The remains of five large pike came to light from a Late Bronze Age Tumulus culture sacrificial feature.⁴⁰ In comparison the size ranges of pike recovered from the early neolithic samples, the greatest length of individuals under discussion here fell into the size category whose individuals may be caught by active fishing, as opposed to gathering or potting usually practiced in small, residual pools.⁴¹ The admittedly hypothetical argument concerning the pike sizes from Ménfőcsanak is confirmed by two bronze hook finds found using metal detectors that may be associated with the time period between the Copper and Late Bronze Ages. The find spot of the metal hook of known provenience is shown in relation to concentrations of fish scales in *Figure 11*. This hook was found in the lower-lying, western section, possibly used at times of low water levels. It is noteworthy that the distribution of fish scales over the surface seems to be more even than that of fish bones. High concentrations of pike and pikeperch scale finds are not only indicative of prehistoric de-scaling at the settlement. In general taphonomic terms, they outline areas with relatively undisturbed deposits.

ACKNOWLEDGEMENTS

Contextual information was collected and edited by Tamás Csuti whose help is gratefully acknowledged.

³⁹ Kreiter, Attila – Pető, Ákos (eds.): *Összesített kutatási jelentés a Győr–Ménfőcsanak, Széles-földek lelőhelyen (KÖH: 34305) felvett talajszelvények talajtani, geokémiai, archaeobotanikai és malakológiai adatairól* (Budapest: Magyar Nemzeti Múzeum Nemzeti Örökségvédelmi Központ Restaurálási és Alkalmazott Természettudományi Laboratórium, 2012).

⁴⁰ Ilon, Gábor: Opfergrube der Hügelgräberkultur in der Gemarkung von Ménfőcsanak. Spiralornament auf einem Tonfries eines Gebäudes. *Acta Archaeologica Academiae Scientiarum Hungaricae* 65 (2014), 5–42.

⁴¹ Kovács, Zsófia Eszter – Gál, Erika – Bartosiewicz, László: Early Neolithic animal bones from Ibrány–Nagyerdő, Hungary. In: *Neolithization of the Carpathian Basin: Northernmost distribution of the Starčevo/Körös culture*, ed. Kozłowski, Janusz, K. – Raczky, Pál (Kraków–Budapest: Polish Academy of Arts and Sciences, 2010), 238–254.

APPENDIX

http://files.archaeolingua.hu/2016T/Ilon_Bartosiewicz_Galik_Appendix.xls

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