

EGGSHELL REMAINS IN THE BRONZE AGE AND EARLY IRON AGE ASSEMBLAGE AT MÉNFŐCSANAK–SZÉLES-FÖLDEK TOJÁSHÉJ MARADVÁNYOK MÉNFŐCSANAK–SZÉLES-FÖLDEK BRONZKORI ÉS KORA VASKORI ANYAGÁBAN •

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Abstract

An exciting collection of archaeozoological finds have been found in the Bronze and Early Iron Age material of Ménfőcsanak–Széles-földek site: among the animal bones, a larger amount of bird bones and even eggshell fragments were identified. In addition, there were chicken bones in the objects of the Tumulus culture which are considered to be the earliest findings in the Carpathian Basin so far. The significance of this new finding is enhanced by the fact that the remains of hatched eggs have been found, that proves not only hen raising but also the breeding of species. The present study has a dual role, as it analyses bird bones and eggs, and enriches Hungarian archaeological literature with a number of new results.

Kivonat

Egy izgalmas archeozoológiai leletegyüttes került elő Ménfőcsanak–Széles-földek lelőhely bronzkori és kora vaskori anyagából: az állatcsontok között nagyobb mennyiségben madárcsontok, sőt tojáshéj töredékek is megtalálhatók. A Halomsíros kultúra objektumainak anyagában tyúkcsontok is előfordultak, amelyek a Kárpát-medencében eddig a legkorábbiaknak számítanak. Ennek az új eredménynek a jelentőségét tovább növeli, hogy kiköltött tyúktojás maradványai is előkerültek, bizonyítva ezáltal nemcsak a tyúktartást, hanem a faj szaporítását is. A tanulmány hiánypótló szerepet kíván betölteni, hiszen egyszerre elemzi a madárcsontokat és a tojásokat is, számos új eredménnyel gazdagítja a hazai régészeti szakirodalmat.

KEYWORDS: BRONZE AGE, BIRD BONE, EGGSHELL, RAISING HENS

KULCSSZAVAK: BRONZKOR, MADÁRCSONT, TOJÁSHÉJ, TYÚKTARTÁS

Introduction

The multi-period (from the Neolithic to the Middle Ages) site complex of Ménfőcsanak–Széles-földek covering about 150 hectares lies east of the Vienna Basin, at the transition zone of the Little Hungarian Plain and the Sokoró Hills in Western Hungary. These hills join the Bakony Mountains on the former sand terraces of the Holt-Marcál backwater and the ancient Rába river.

The highway M1 between Vienna and Budapest crosses this site in the NW-SE direction and the main road No. 83 leading from Győr to Pápa in

NE-SW direction. During the Roman times a road had run by along the latter track, while in ancient times the transport might be possible only this path through the marshlands of Nagyrét and the floodplain of Rába river.

The archaeological excavation (registration ID 34305) was conducted on an altogether 277165 m² territory, from October 2009 to September 2011 (Ilon 2014; Ilon 2017), and now it belongs to the city of Győr. In addition to a high amount of animal bones (Tugya et al. 2015), a high number of archaeobotanical remains (Pető et al. 2012; Ilon 2014; Kenéz et al. 2014), fish bones, scales

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(Ilon 2014; Ilon et al. 2016) and insect remains (Merkl & Ilon 2012), as well as a small number of small eggshell fragments were found during the excavation, owing to the flotation of samples. The latter is published in this article.

Aims

In Hungary egg remains are the least studied material among archaeozoological findings. Very little attention has been paid to them until now. The reason might be the rare opportunity to sift the soil material from the objects, except in the case of graves and there is even less opportunity for the flotation of samples. There is a growing interest for the analysis of archaeological eggshells in other parts of Europe, as it is indicated by published studies (Stewart et al. 2013; Stewart et al. 2014; Jonuks et al. 2017; Lamzik 2013; Sichert et al. 2019).

As far as we know, the detailed examination of eggs from the Bronze and the Early Iron Age have not yet been carried out in Hungary so far. The only known site from this period is the urnfield cemetery in Békásmegyér, where a great crested grebe's egg was hidden in a jug in one of the graves, and a fragment of a hatched wild goose egg was found next to the urn (Nagy 1979, 42-43, 66).

Only a few studies have been written about the eggs of the later eras, primarily about the analysis of eggs from the Avar, Langobard period and Middle Ages (Jakab 1978, 1980; Tugya 2012; Tugya 2016; Tugya 2017).

Failing comparative material and publications, this study is primarily limited to the description and short analysis of the eggs. Its publication is necessary nonetheless because analysis of ancient eggshells fills a gap. On the one hand, these finds serve as proof of consuming the eggs of birds in the Middle and Late Bronze Age, as well as in the Early Iron Age. On the other, the hatched eggs could prove early poultry keeping.

We have examined 15 egg samples from 5 objects of the site. One of the samples comes from a Middle Bronze Age (Transdanubian Encrusted Pottery culture) pit, another sample from the pit of the Koszider horizon and the third one from the pit of the Tumulus culture. A further sample comes from the pit of the Urnfield culture and eleven samples are from the Early Iron Age. All Early Iron Age samples have been lifted out from the same building (Fig. 1-3.).

Our goal was to draw attention to the importance of eggshell fragments, as they can prove not only the consumption of eggs of certain species, even

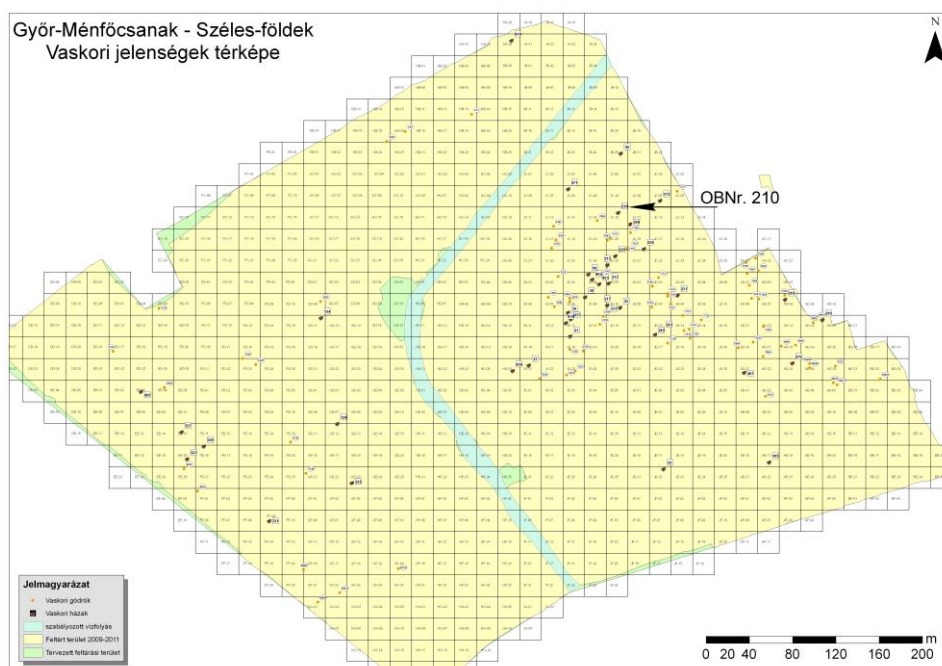


Fig. 1.: Early Iron Age buildings and pits in the area of Ménfőcsanak–Széles-földek (drawn by István Eke)

1. ábra: Koravaskori épületek és gödrök a ménfőcsanaki Széles-földek területén (Készítette: Eke István)

(full size / teljes méret: [Appendix 1](#))

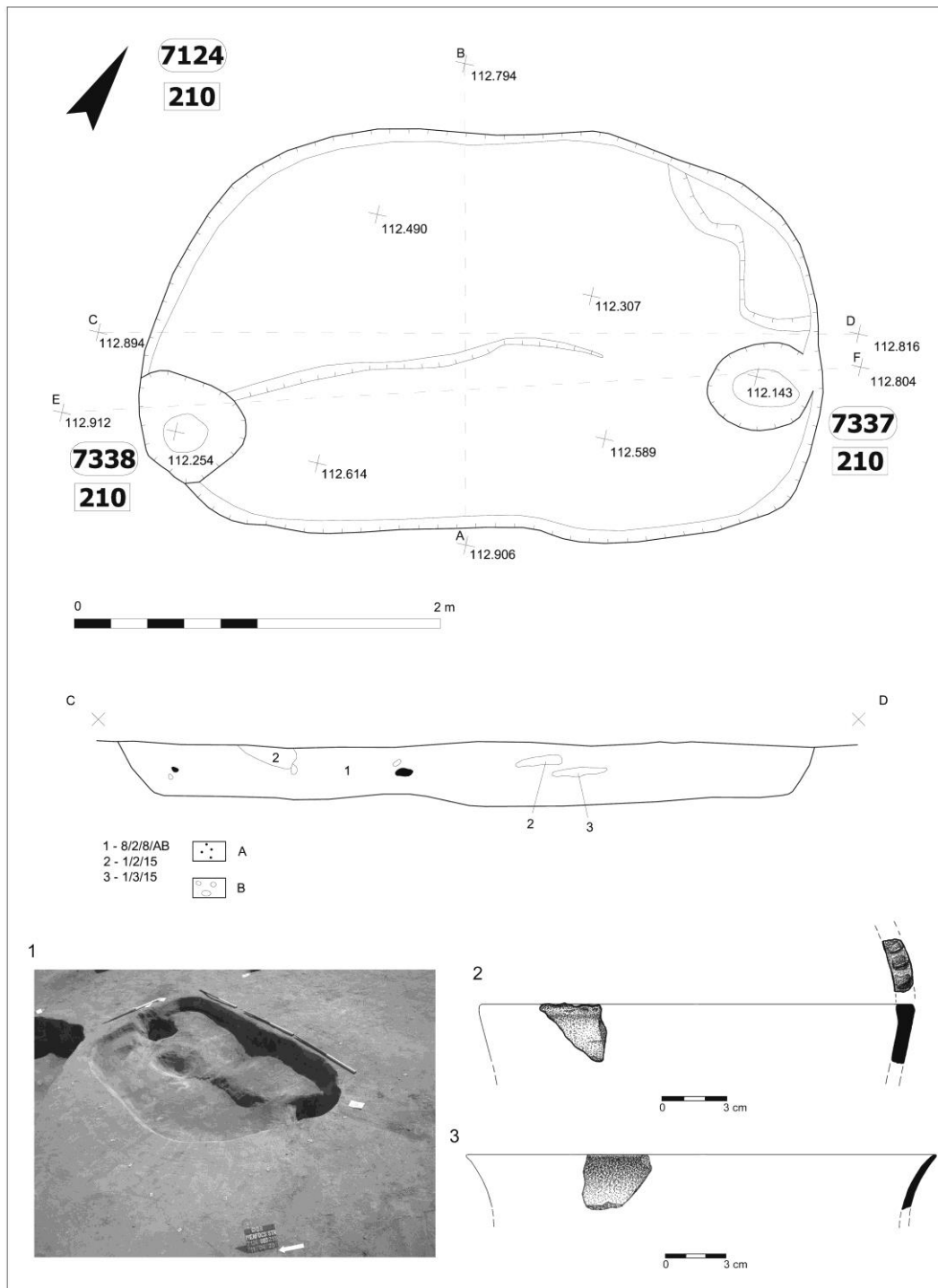


Fig. 2.: Documentation and pot fragments of object 210 (Drawing: Hajnalka Binder)

2. ábra: A 210. objektum dokumentációja és edénytöredékei (Rajz: Binder Hajnalka)

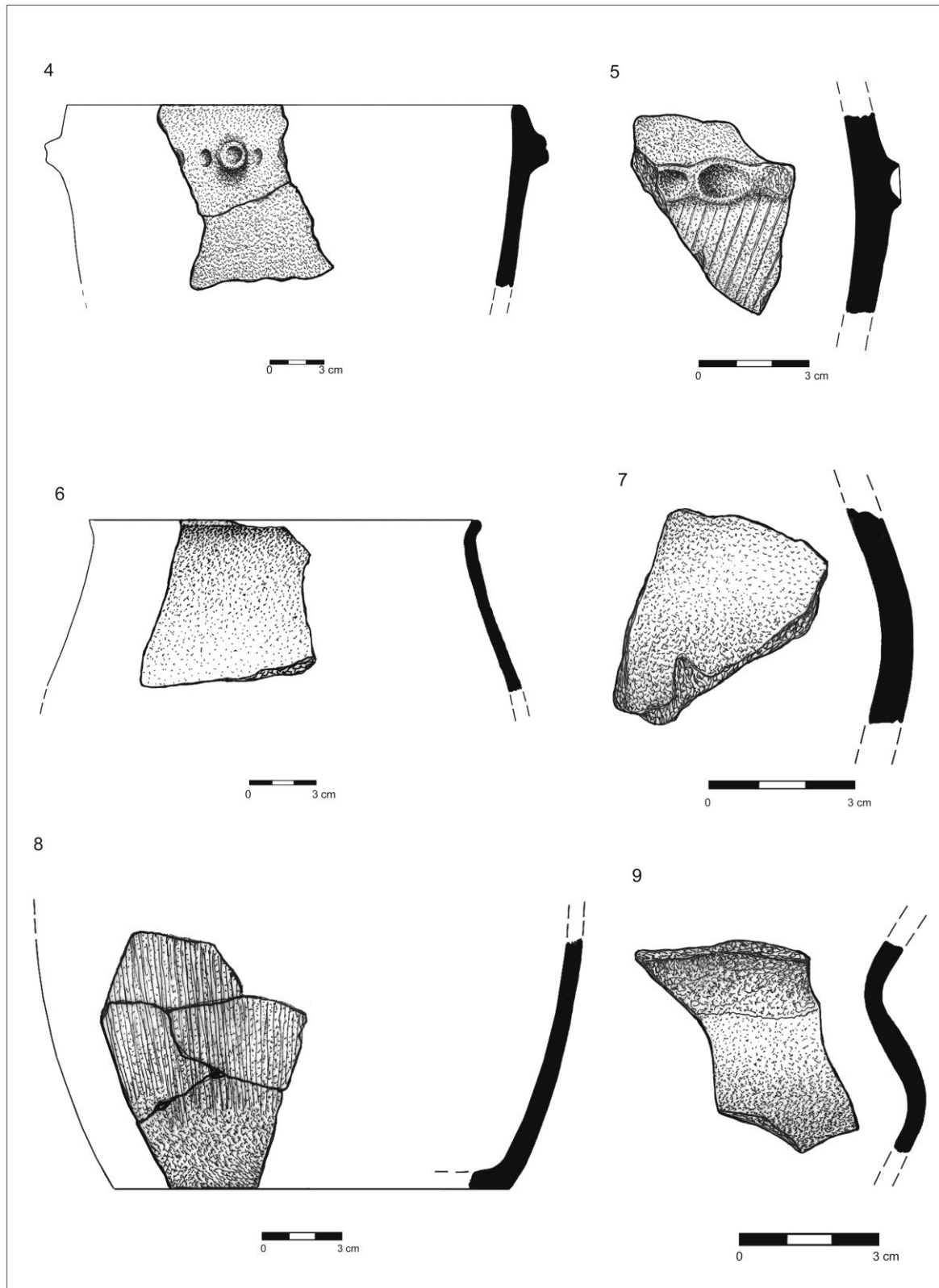


Fig. 3.: Pot fragments of object 210. Fragment under No. 5 is of secondary position from the Tumulus culture. (Drawing: Hajnalka Binder)

3. ábra: A 210. objektum edénytöredékei. Az 5. sz. alatti töredék másodlagos helyzetű a Halomsíros kultúrából (Rajz: Binder Hajnalka)

without bones, but also chicken raising and breeding. The remains of wild hen have not been identified yet in the Carpathian Basin, so hen eggs confirm the presence of domestic hens, and the remains of hatched eggs directly indicate the breeding of the species.

Based on our experiences, investigations on eggs and bird bone complement each other, thus in our study a literature survey on Bronze Age bird bones in the Hungarian archaeological record was also done. Our aim was to define the framework of Bronze Age poultry farming in the Carpathian Basin.

Chronology of the bird bones at the site

In addition to eggs, a large number of bird bones have also been found at Ménfőcsanak – 43 pcs from the Bronze Age. Four bone pieces can be assigned to the Kisapostag culture (a skull, a radius, an ulna, and a tibia; Bonyhád Grave No. 226, Kaposvár Grave No. 45: 2130 – 1980 calBC – Kiss et al. 2019. 181.); the other bones could not be assigned to any species. The cubit bone of a bird, the species of which cannot be determined, belongs to the eastern Austrian Litzenkeramik culture. The long bone fragment of a bird, which cannot be determined, can be assigned to the Middle Bronze Age Gáta-Wieselburg culture (Nagyecskény Grave No. 55: 2020 – 1940 calBC; Zsenyeczka cemetery: 1900 – 1600 calBC – Kiss et al. 2019. 181.). The goose bones, which have been found together with finds of the Transdanubian Encrusted Pottery culture, had the highest quantity: 27 bones of a fully-grown goose came from one of the objects. The humerus of a bird has come to light from another pit. The fragment of the radius and the cubit bone of a goose-like bird have been found in the Koszider horizon. In the objects of the Tumulus culture, five bird bones – among them two hen bones (*humerus* and *carpometacarpus*) - have been found. The latter one comes from a fully-grown laying bird. There are three hen bones among the Early Iron Age (Ha C–D) animal bones of the site. They belonged probably to the same adult animal (Tugya et al. 2015, 271).

Materials and methods for examining the general characteristics of eggshells

Eggshell samples are very small and could not be found without flotation. The smallest sample is smaller than 1x1 mm and even the largest one is only 3x4–5 mm in size. There were some poorly preserved fragments which were unsuitable for analysis. In case of these fragments, the mammillary layer of the internal surface is not visible, it is damaged and abraded which makes species determination questionable. If the aforementioned layer remained at least partially in a

good condition, the species could also be determined more securely.

Eggshells were examined at the Applied Natural Sciences Laboratory of the Hungarian National Museum in 2013. The observations were carried out with a LEICA M80 microscope, at 60x magnification. The thickness of eggshells was also measured. It is one of the starting points for determining the species. E. g. the shell of eggs of hens is generally 0.3–0.35 mm, of domestic geese 0.5–0.6 mm, of elks 0.525–0.55 mm, and of domestic ducks 0.35–0.4 mm thick (Sidell, 1993).

It is also an important question whether the eggshell fragments can be interpreted as kitchen waste or they are the remains of hatched eggs. It is determined as follows. During the embryonic development, the metabolism of the developing embryo is carried out by the chick's amnion, i.e. the *allantois*. Coming into contact with the inside of the eggshell, the allantois resorbs, i.e. dissolves the calcareous material of the shell which infiltrates into the body and ossature of the chick. Traces of the resorption of the lime material can be observed under the microscope on the inside mammillary layer of the limy shell. When the egg is hatched, the mammillae end in a crater-like hole (**Fig. 4/3**). When we can see an intact mammillary layer, i.e. the ends of the little limy pillars (*mammillae*) are rounded, it means that no resorption occurred and the egg was not hatched (Jakab 1980, 312; Tangl 1908) (**Fig. 4/1**). In case of hatched eggs, small craters can be seen on the ends of the mammillae instead of the rounded ends as a result of the lime dissolving function of the allantois. Resorption ditches and holes might also be observed among them. This structure can be observed everywhere on the internal surface of the limy shell of the hatched egg, except for the region of the air chamber, generally at the blunt end of the egg. Due to the air chamber, in this area the allantois cannot come into contact with the eggshell thus, it cannot resorb its lime material either. As a result, the mammillae ends of the inside shell layer remain intact in this area (Jakab 1978, 42).

The third step of the examination is the determination of the number of mammillae per 1 mm². In the case of hen eggs, the number of mammillae per 1 mm² ranges from 57 to 173. For domestic ducks the number of mammillae is between 28 and 173, for domestic geese it is between 28 and 57 pcs and in the case of elks it is between 28 and 87 per 1 mm² area (Sidell 1993, 13). The thickness of eggshells and the number of mammillae per 1 mm² are together suitable for species determination. All the descriptive data on the analysed 15 samples are collected in the **Appendix 2**.

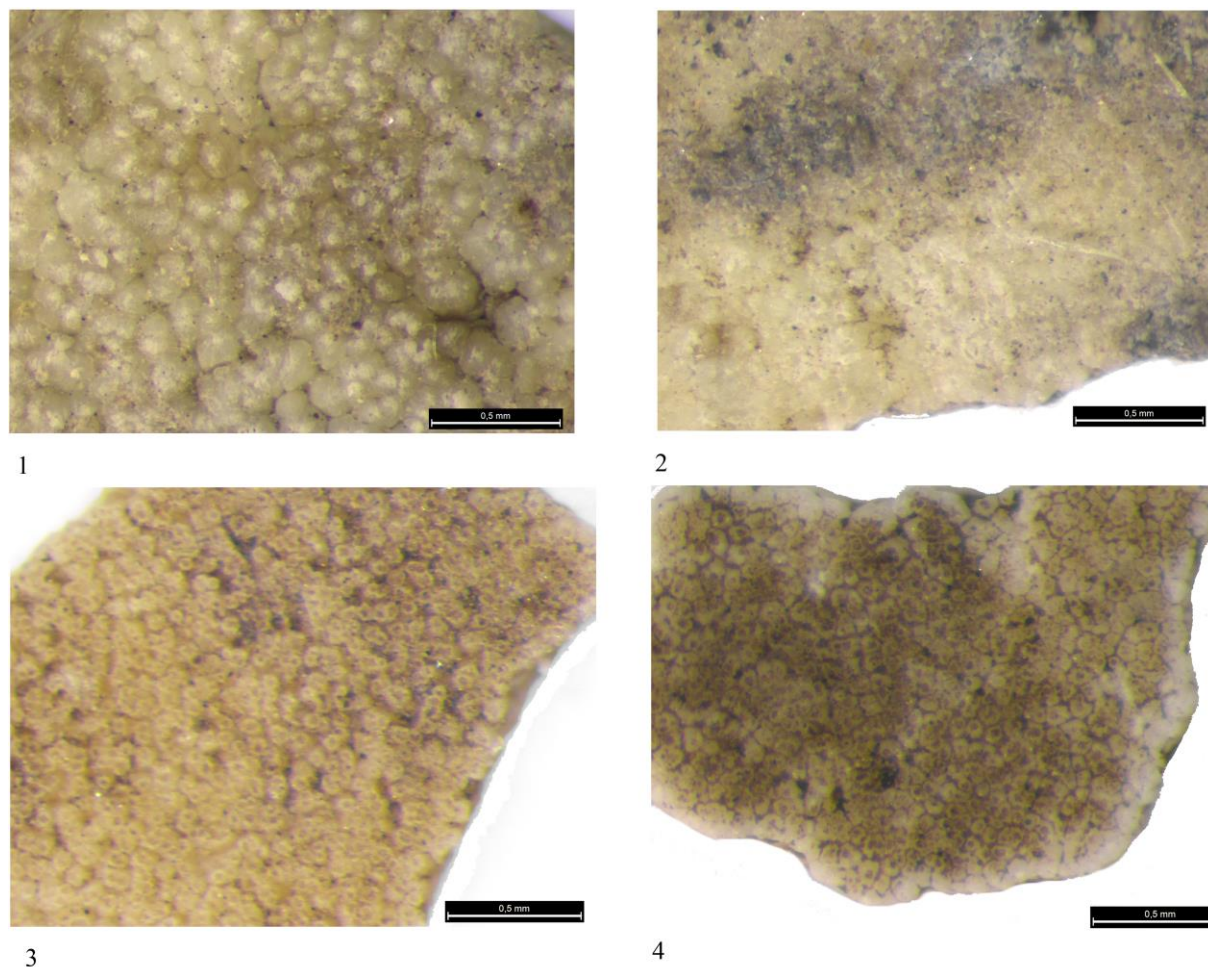


Fig. 4.: Fragments of bird eggs. 60x magnification.

4/1: SNR-7219 (finds label: 11406) Fragment of a goose-like egg; **4/2:** SNR-7899 (finds label: 15775) Species cannot be determined; **4/3:** SNR-5901 (finds label: 11110) Fragment of a hen egg; **4/4:** SNR-9721 (finds label: 22803) Fragment of a hen egg.

4. ábra: Madártojás töredékek. 60x-os nagyítás

4/1 ábra: SNR-7219 (leletkísérő: 11406) Lúdféle tojástöredéke; **4/2 ábra:** SNR-7899 (leletkísérő: 15775) Faj nem határozható; **4/3 ábra:** SNR-5901 (leletkísérő: 11110) Tyúktojás töredéke; **4/4 ábra:** SNR-9721 (leletkísérő: 22803) Tyúktojás töredéke.

Results

The eggshell sample of the Transdanubian Encrusted Pottery culture (Ménfőcsanak SNR/Grave No. 8464: 1960 – 1830 calBC - Kiss et al. 2019, 185.)

An eggshell fragment of 2x2 mm in size has been found in the pit SNR-7219. It came from an unhatched goose egg (Fig. 4/1). The bird eggs were probably collected and consumed during the nesting season. When the birds were not kept around the house in captivity, the eggs which were laid had to be collected in time before the embryonic development started, i.e. nest building and brooding of birds had to be followed with attention.

In addition to the remains of domestic animals (cattle, sheep/goat, domestic pig, and dog) and a small number of fish bones as well as a greater quantity of shellfish, the objects of the culture also contained several bird bones, 27 pcs of goose bones among them. The examination results of the bird bones and the eggshell complete each other.

The eggshell sample of the Koszider horizon (Bonyhád cemetery: 1630 – 1460 calBC - Kiss et al. 2019, 188, Fig. 4, 11, 13)

There is a fragment of an unhatched egg from pit SNR-7899. The mammillary layer of the sample is abraded and it is not suitable for examination (Fig. 4/2). Thus, species determination is impossible.

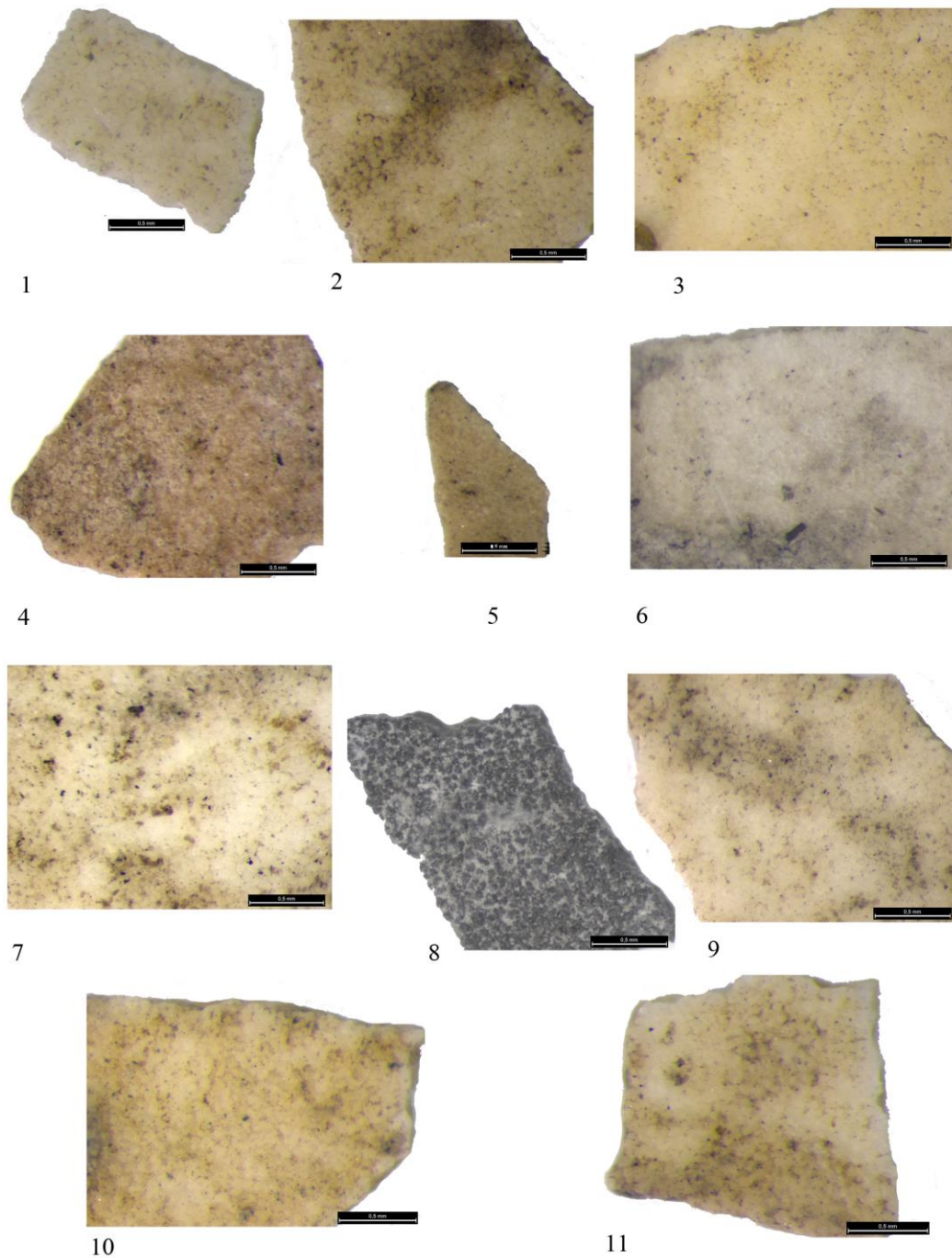


Fig. 5.: Fragments of bird eggs. 60x magnification.

5/1: SNR-7124 (finds label: 11071). Species cannot be determined; **5/2:** SNR-7124 (finds label: 11075). Fragment of a hen egg; **5/3:** SNR-7124 (finds label: 11077). Probably the fragment of a hen egg; **5/4:** SNR-7124 (finds label: 11080). Species indeterminate; **5/5:** SNR-7124 (finds label: 11082). Species cannot be determined; **5/11:** SNR-7124 (finds label: 11092). Species cannot be determined.

5. ábra: Madártojás töredékek. 60x-os nagyítás

5/1 ábra: SNR-7124 (leletkísérő: 11071). Faj nem határozható; **5/2 ábra:** SNR-7124 (leletkísérő: 11075). Tyúktőjástöredéke; **5/3 ábra:** SNR-7124 (leletkísérő: 11077). Valószínűleg tyúktőjás töredéke; **5/4 ábra:** SNR-7124 (leletkísérő: 11080). Faj bizonytalan; **5/5 ábra:** SNR-7124 (leletkísérő: 11082). Faj nem határozható; **5/6 ábra:** SNR-7124 (leletkísérő: 11084). Tyúktőjás töredéke; **5/7 ábra:** SNR-7124 (leletkísérő: 11086). Faj nem határozható; **5/8 ábra:** SNR-7124 (leletkísérő: 11087). Tyúktőjás töredéke; **5/9 ábra:** SNR-7124 (leletkísérő: 11088). Valószínűleg tyúktőjás töredéke; **5/10 ábra:** SNR-7124 (leletkísérő: 11089). Valószínűleg tyúktőjás töredéke; **5/11 ábra:** SNR-7124 (leletkísérő: 11092). Faj nem határozható.

The eggshell sample of the Tumulus culture (Ménfőcsanak SNR-7765: 1σ1608 – 1538 calBC – Ilon 2014, 38, Abb. 5)

In spite of its shell thickness, which is thinner than the average, the sample coming from pit SNR-5901 has proved to be a hen egg. The mammillae are craterous (Fig. 4/3). Thus, we can say that it is the remain of a hatched eggshell. The hatched hen egg proves the earliest keeping of hens at this site.

The eggshell sample of the Urnfield culture (Ménfőcsanak Grave No. 3, 11: 1σ 1113 –1012 calBC – Ilon 2015, 248)

Only one egg sample of about 1 mm² in size has been found in pit SNR-9721. Fortunately, the mammillary layer is distinct, and it can be ascertained that it is the remain of a hatched hen egg (Fig. 4/4). The urnfield objects of the site did not contain any bird bones. This is another reason why the result of the examination of the egg remains is so important, i.e. it is a proof of keeping hens.

The eggshell samples of the Early Iron Age (Ménfőcsanak OBJ 82, 213, 267, 276: 1σ770 – 400 calBC – Đurkovič 2015, Tab. 4)

The 11 samples were found in building 15 of SNR-7124 (object 210) (see above). Most samples were in a bad condition, the mammillary layer is highly abraded and it is weakly preserved. Yet, 6 samples proved to be hen eggs (Fig. 5/2, /3, /6, /8, /9, /10) and two of them coming from hatched eggs (Fig. 5/6, /8). In addition to eggs, the object contained 40 pcs of animal bones; among them two hen bones, i.e. one right femur and one right tibia, too.

The hen was a rare species even during this period; keeping of hens at Ménfőcsanak was confirmed not only by the bones, but by the egg remains too. They were probably kept mostly for consumption. Yet, the shell fragments of the hatched eggs confirm also that the species was propagated.

Bird and hen bones from the Bronze Age in the Carpathian Basin

Compared to the remains of mammals, much smaller quantities of bird bones were found at prehistoric sites. Their determination and analysis require special knowledge and comparative bone material. Therefore, most archaeozoologists are not willing to carry out precise species determination. In many cases it is limited to the general classification as ‘bird bone’ and perhaps an indication of the size.

Erika Gál, bird bone specialist collected and analysed the bird remains of 27 Bronze Age sites from the Early Bronze Age Makó- and Somogyvár-Vinkovci culture to the Late Bronze Age Gáva and

Kyjatice culture (Gál 2013). Hen bones have not been identified, although bird bones of indeterminable species have been found at 10 sites (Gál 2013) (Fig. 6: 1-27). We aimed to supplement her work with our results and with newer or lesser-known data found in the literature to define the framework of Bronze Age poultry farming in the Carpathian Basin.

At the Bronze Age settlement of Kaposújlak-Várdomb, preserving the traces of the Somogyvár-Vinkovci culture, two bird bones, i.e. a goose and a crow, have been determined (Gál 2009) (Fig. 6/28).

Sándor Bökönyi identified goose and duck bones in the material of finds from the Bronze Age hillfort (late period of the Vатья culture) of Tiszaalpár (Fig. 6/29). Among the bird bones of indeterminable species, the remains of medium-large, small-medium and small-bodied species alike occurred (Bökönyi 1982).

11 bird bones have been found at the pre-Gáva period site of Csanádpalota-Földvár (Fig. 6/30); species determination was not possible (Szeverényi et al. 2015).

The occurrence of the bones of domestic fowls and especially hen as part of the bird bones, is even rarer. In our region, hen bones can only come from domestic hens (*Gallus domesticus* L.) because the species originates from Southeast Asia; its wild form was not present in Europe. Domestic hens had already occurred in Southeast Europe at the end of the 2nd millennium BC. The skeleton of an egg-laying hen is known from Prague (Ostrov-Zápy) and bones have been found at the site Rubin (Czech Republic) which show that the hen appeared in the Late Bronze Age (Ha B3 period) (Bartosiewicz 2013).

Hen bones from the Late Bronze Age – Early Iron Age were recognized to be the earliest ones over a long time in Hungary: two hen bones coming from the site Balassagyarmat-Káposztások (Fig. 6/31) (Bartosiewicz-Gál 2010) and one hen bone coming from the site Ludányhalászi-Sóderbánya (Fig. 6/24) (Tugya 2010). They belong to the earliest finds of hens in the Carpathian Basin (Gál 2012).

At the Urnfield culture cemetery at the site Maglód 1 (Fig. 6/32) a fragmented femur of a hen was identified (Tugya in press) in one of the fire pit graves, i.e. a ritual cremation which was used during the Ha A1–B1 period. Thereby one can say that hen occurred in the Carpathian Basin even earlier.

Two hen bones have also been found in one of the objects of the Tumulus culture at Ménfőcsanak. Thereby, one can say that keeping of hens in the Carpathian Basin – which can be proved by the bones too – occurred here even earlier.

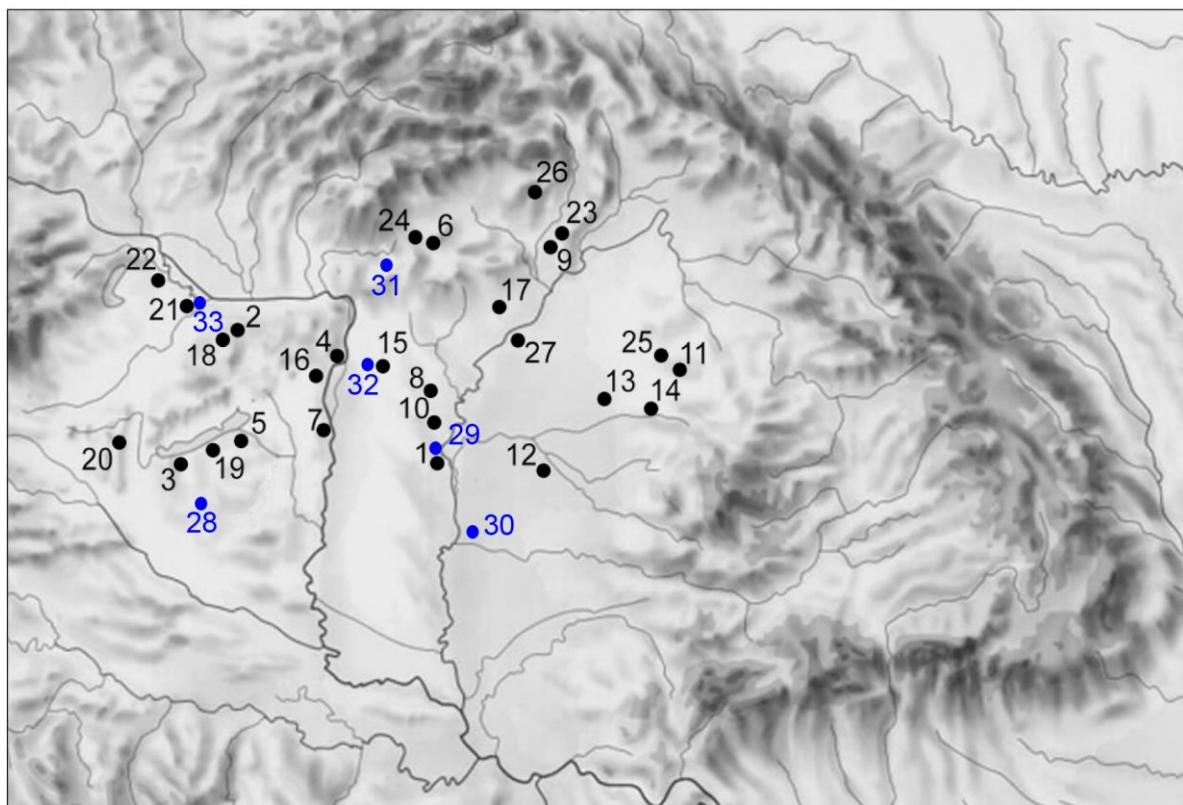


Fig. 6.: Bronze Age sites that provided avian remains in the Carpathian Basin (after Gál 2013, 201, Fig. 1; the addition of this study is marked in blue, sources are mentioned in the text).

6. ábra: Madármaradványok a Kárpát-medence bronzkori lelőhelyein (Gál 2013, 201, Fig. 1. nyomán; kék színnel jelölve a jelen tanulmányban tett kiegészítést, hivatkozásokat lásd a szövegben).

1. Csongrád–Sertéstelep; 2. Táp–Borbapuszta; 3. Balatonkeresztúr–Réti-dűlő; 4. Békásmegyér–Buváti; 5. Mezőkomárom–Alsóhegy; 6. Salgótarján–Pécskő; 7. Dunapentele–Koszider; 8. Tápiószéle–Tűzköves; 9. Tiszaluc–Danka-domb; 10. Tószeg–Laposhalom; 11. Szalacs (Sălacea-Dealul Vida, Romania); 12. Békés–Városerdő; 13. Berettyóújfalva–Szilhalom; 14. Kőrösgyéres (Girișu de Criș–Alceu, Romania); 15. Mende–Leányvár; 16. Százhalombatta–Téglagyár; 17. Füzesabony; 18. Nagydém–Középrépaszta; 19. Balatonszemes–Egyenes-dűlő; 20. Zalaszentmihály–Tőzeg-telep; 21. Börcs–Paphomlok-dűlő; 22. Mosonmagyaróvár–Német-dűlő; 23. Prügy–Tököföld; 24. Ludányhalászi–Sóderbánya; 25. Érmihályfalva (Valea Lui Mihai, Romania); 26. Felsővadász–Várhegy; 27. Tiszafüred–Ásotthalom; 28. Ménfőcsanak–Széles-földek; 29. Tiszaalpár–Földvár; 30. Csanádpalota–Földvár; 31. Maglód 1.; 32. Balassagyarmat–Káposztások; 33. Kaposújlak–Várdomb.

In the current territory of Hungary, the earliest hen keeping based on bones was changed from the previous Urnfield culture to the era of the Tumulus culture. According to eggshell analysis the species was bred locally, as proved by a fragment of a hatched eggshell.

Conclusion

The results of the examination of the bird bones and eggshell fragments from the Bronze Age found at Győr–Ménfőcsanak complement each other well: not only two hen bones but also a 2x2 mm fragment of a hatched hen egg were unearthed from the objects of the Tumulus culture. Thus, it was possible to verify keeping and breeding hens, too. For a long time, hen bones from the Late Bronze Age and the Early Iron Age were considered to be the earliest ones. It is not widely known but a hen

bone has already been unearthed from the cremation grave of a cemetery of the urnfield culture. And now hen bones and hen eggs were found which are the earliest in the Carpathian Basin and can be dated back to the early 1608–1538 calBC.

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