

An Arheozoological Analysis of Teeth of Lower Jaw of Pigs Coming from the Kostolac Culture (3,250–3,000 B.C.), Originating from Vučedol, Including Comparison with Recent

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ABSTRACT

An investigation has been made within the expertise regarding teeth of 10 left halves of mandibles of recent sows as well as teeth of 18 pig mandibles originating from Kostolac culture (3,250 –3,000 B.C.) from Vučedol archaeological location. TWS (Tooth Wear Stage) has been determined at all molars, according to Grant method¹ and a corresponding numerical equivalent has been added, so MWS (Mandibular Wear Stage) has been obtained by summing up the above. On the basis of these values and ranges of MWS, an approximate age at the time of death has been determined for each unit. All the recent units have been older than 17 months, while the age of Kostolac units has come out to be between 14 and 17 months.

Key words: pig's teeth, Vučedol, teeth wear stages

Introduction

The Kostolac culture is one of the three most specific Eneolithic layers at the Vučedol archaeological locality, situated at the right plateau of the river Dunav right bank, 4.5 km southeast of Vukovar.

Eneolithic (3,500–2,200 B.C.) or the Copper Age is frequently called a transitive age, denoting the continuous transfer from the younger Stone Age to the Bronze Age. The Kostolac culture is determined by the period between 3,500 –

3,000 B.C. and is characterized by firm and permanent overhead structures, mostly of rectangular shape, abandoning the nomadic way of living, an intensive engagement in agriculture and especially in cattle breeding².

Pigs belong to ordo of Artiodactyla, subordo of Suiformes, family of Suidae. They are omnivores and gather food (bulbs, seeds, acorns, insects), they dig up the earth with the snout and catch and eat small vertebrates. The teeth formula of the permanent teeth is as follows:

I3/3; C1/1; P4/4; M3/3.

The lower incisors are cylindrical and by usage they became chisel shaped, while the upper incisors are low and blunt. The upper canine teeth or tusks are large, bent upwards, triangular at the cross – section and very sharp, but the lower ones are wedge-shaped. The upper and lower canine teeth come out outside the mouth cavity. Premolars have a low crown but the teeth sharp points are amalgamated and form a long cutting edge. Molars are explicitly rebellious. Sharp teeth points are low-levelled, rounded and separated by grooves and fissures, distributed along the whole width of the chewing area. The number of teeth sharp points, the chewing area and the number of teeth roots of pigs increases from the first to the third molars³.

Deciduous incisors and canine teeth differ from the permanent ones by their fairly small crowns, while the premolars and molars are of a similar shape, except the deciduous upper third and the lower fourth premolars.

At birth there are deciduous I3 and canines. I1, P3 and P4 follow, then P2 and finally I2. All deciduous teeth are grown up within the denture not later than 117 days after birth. P1 and M1 are the first permanent teeth. I3 and C, as well as M2 and the remaining premolars follow at the same time. Finally grow up I2 and M3

at the age of 17 (Landras breed) – 22 months late mature breed)⁴.

During the process of pigs domestication, significant macro-morphological changes have happened, especially regarding bones of the facial part of cranium which as the lower jaw become shorter and wider, and the whole facial profile becomes concave⁵. Consequently, a reduction of teeth comes up, specially of the lower third molar, so its mediobuccal diameter is a significant indicator of pigs domestication.

Material and Methods

Teeth of 10 mandibles of recent sows, Landras breed, have been investigated and compared with teeth of 18 mandibles of pigs originating from Kostolac culture. We have got heads of recent pigs by courtesy of the pig-farm »Gradec« within the complex of PIK Vrbovec. Mandibles coming from Kostolac culture originate from diggings executed in 1984/1985, at the location Streim vineyard of Vučedol location. Approximately 15,000 of animal bones as well as bone fragments and teeth have been excavated from pits near the houses which served primarily as hoards and as waste pits later on, all these transferred in 1995 to the Laboratory for archaeozoology, at the Department of anatomy, histology and embryology of the Veterinary Faculty.

Referring to fragments of the whole material, a stage of preserved condition of a find has been determined, so for this research mandibles of pigs of the first stage of preservation have been separated (a completely preserved finding), of the second stage (preserved more than a half of an anatomic element) and the third preservation stage (preserved less than a half of an anatomic element).

The approximate age at the time of death has been obtained by Grant method¹, which is based on consumption of

teeth enamel of occlusal surface. Namely, a darker coloured dentine remains below the expended enamel and with the time these »islands« of dentine become larger and the enamel is reduced. This process goes through several stages called Tooth Wear Stages (TWS). The first, the second and the third molar of one half of mandible have their TWS from a top (Figure 1) or they are at the stage of growing (from C to U). Thus, to each tooth of a particular TWS its numeric equivalent is added (Figure 1), and the summary of all three molars of one mandible makes Mandibular Wear Stages (MWS). So the higher calculated MWS, the older the animal was at the time of death.

This method is especially acceptable for determining the age according to teeth of archaeological material, where often some teeth are lacking. TWS of lacking

teeth can be foreseen by numerous different TWS combinations of the existing teeth, which the author of this method investigated on the large number of recent mandibles having a complete denture (set of teeth).

Results

TWS has been determined in mandibles of recent sows, on all three molars of the left half. All specimens have got grown up permanent teeth, so the conclusion has been made that at the time of death animals were 17 to 22 months old and more. Summing up the numerical equivalents of TWS phase of each molar of a particular mandible, we got MWS. The specimen under number 5 has got M3 in TWS phase U, i.e. tooth has completely come up, but without visible tra-

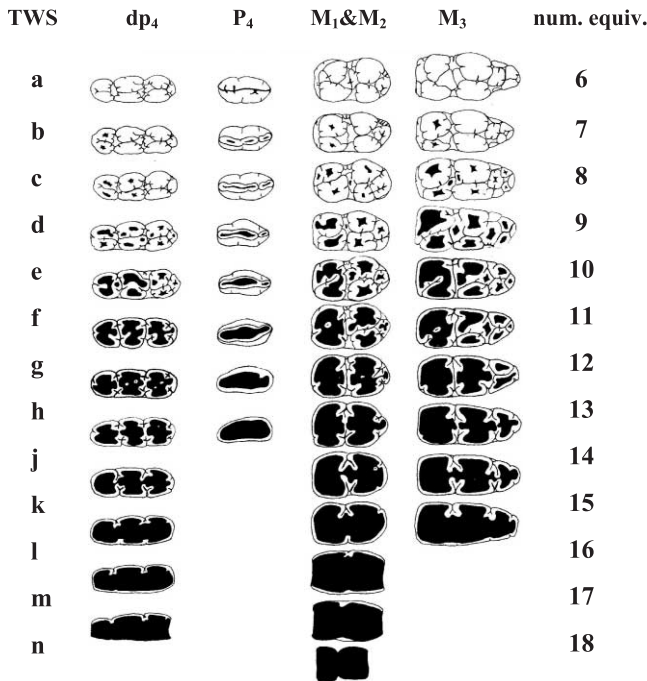


Fig. 1. TWS of pig teeth and its numerical equivalent.

ces of consumption. Investigating Landras, which is probably the most selected pig breed of all European commercial breeds, points that M3 is completely developed at 17 months (MWS = 25). The range of the remaining MWS values is between 27 and 42 (Table 1).

Investigating 18 specimens of archaeological mandible 13 belong to the left and 5 to the right half of mandible. 2 specimens belong to the first, 4 to the second and 12 to the third stage of preservation.

TABLE 1
TWS, NUMERICAL EQUIVALENT AND MWS FOR RECENT MANDIBLES

Mandibles number	M1		M2		M3		MWS
	TWS	Numerical equivalent	TWS	Numerical equivalent	TWS	Numerical equivalent	
1	h	13	f	11	d	9	33
2	k	15	h	13	d	9	37
justright 3	f	11	e	10	c	8	29
4	g	12	d	9	a	6	27
5	f	11	d	9	U	5	25
6	g	12	e	10	b	7	29
7	m	17	h	13	d	9	39
8	f	11	e	10	c	8	29
9	m	17	h	13	g	12	42
10	h	13	e	10	c	8	31

TABLE 2
TWS, NUMERICAL EQUIVALENT AND MWS FOR ARCHAEOLOGICAL MANDIBLES

Mandibles signature	dP4	P4	M1		M2		M3		MWS
	TWS	TWS	TWS	Num. equiv.	TWS	Num. equiv.	TWS	Num. equiv.	
V84K52		c	d	9	*c	8	*U,*b	5;7	22;24
V84K58	g		c	8	V	2			10
V84K68			e	10	c	8	1/2	4	22
V84K2065			f	11	d	9	E	3	23
V84K2276			e	10	b	7	V	2	19
V85K2307	g		d	9	C	1			10
V85K2309	d		c	8	V	2	*C	1	11
V85K2312			c	8	1/2	4	C	1	13
V85K2313			d	9	a	6	V	2	17
V85K2322					d	9			24–31
V85K2324	k		e	10	*a	6	*C	1	17
V85K2577			*k	15	g	12	E	3	30
V85K2578		c	f	11	d	9	*b	7	27
V85K2753		U	e	10	c	8	*C	1	19
V85K2763			*g	12	c	8	V	2	22
V85K2810			*k	15	g	12	E	3	30
V85K2811							1/2	4	20–29
V85K2821							V		16–24

* – predicted values

The fourth specimens have got deciduous P4, but M3 has not come up or there is a crypt only visible at the place of a tooth about to come up, i.e. TWS = C, that has been found out within the various combinations of familiar TWS values for dP4, M1 and M2. The permanent P4 in early matured pigs breeds, supposing that such have been a primitive breed breeding in Kostolac period, grows up at the age of 13 months. A range of MWS values of these specimens moves from 10 to 17. TWS has been determined on 3 specimens for P4, as help for determining TWS of the teeth lacking due to specimen damage. It has to be pointed out that values for dP4 and P4 are not included in the summary for MWS.

The smaller number of complete teeth in mandible to which TWS can be determined, the higher number of various combinations, so the MWS range is also higher. For example in the specimen of signature V85K2821 only M3 is present, whose TWS=V=tooth is visible in a crypt, but below bones level. In this case 11 different combinations are possible, having MWS range 16–24 (Table 2).

MWS range for Kostolac mandible varies from 10 to 30. In mandibles having MWS= 30, M3 is in E phase of TWS, i.e. a tooth starts growing through bone. In this case the last tooth grown up completely is I2, which is fully-grown at the age of 14 (early matured breeds) to 22

months, depending on different authors. MP3 grows up at the age of 17–22 months. It is possible to assume that MWS 10 belongs to an animal of 13 months of age, and MWS 30 to an animal of at least 14, but not more than 17 months of age, because early matured breeds M3 come up with 17 months, and in our investigation there is no M3 completely grown up.

The comparative survey of MWS values for recent and Kostolac mandibles has been presented in Figure 2.

Discussion and Conclusion

The youngest recent individual (Figure 3) at the time of death was 17 months old, but the remaining 9 were older (Figure 4). Taking into consideration that their mature weight of 90 kgs is reached at the age of 5 months⁶ it can be assumed that having 17 months they have not completely fulfilled their breeding function, so that they have been economically exploited.

The youngest Kostolac individual unit (Figure 5) was 13 months young, but the oldest one (Figure 6) was less than 17 months. The finding of bones mostly of young population within the age of 1–2 year confirms the animal breeding for meat production⁷. An investigation of animals age originating from Vučedol archaeological locality based on teeth⁸ also confirms that within a population of do-

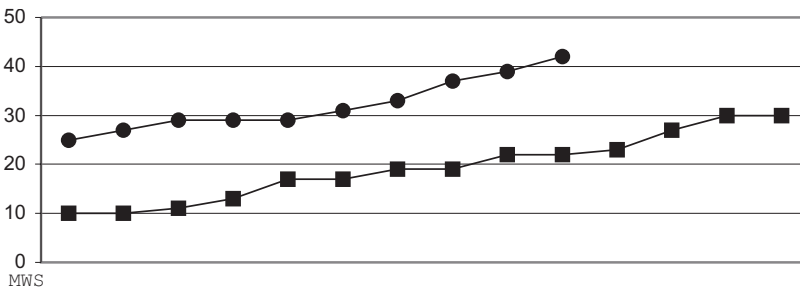


Fig. 2. Comparative survey of MWS for recent (●) and archaeological (■) mandibles.



Fig. 3. Left mandibular teeth of the youngest recent pig.



Fig. 4. Left mandibular teeth of the oldest recent pig.

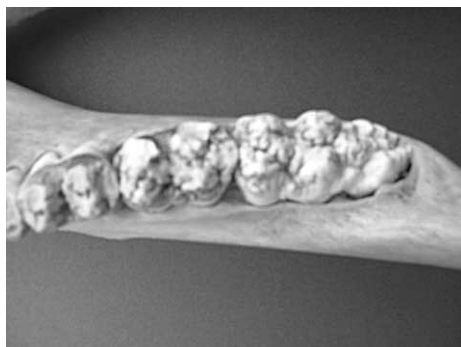


Fig. 5. Mandibular teeth of the youngest Kostolac pig with deciduous teeth (dp4).



Fig. 6. Mandibular teeth of the oldest Kostolac pig.

mestic pigs there are mainly younger ones, which also confirms pigs breeding for a meat.

According to the analysis of the teeth remains from Baden culture (Vučedol), pigs were butchered at the age of 10–14, respectively 18 months⁹. Analyzing bovine long bones from the Eneolithic at the Vučedol archaeological site, only 11% of samples belong to young animals, because cattle was raised mainly for food (meat), but also for secondary products (milk, draught exploitation)¹⁰.

Although Bartosiewicz¹¹ considers that a larger number of bones of young ani-

mals can indicate the so called autumn choice – removal of unwanted young cattle before winter due to limitation of available cattle food, we consider that was not the case there. Young units were probably exploited when a specific weight had been achieved and were slaughtered within the period of 3–4 months. Nowadays meat i.e. breeding animals are being exploited at the weight of 100–110 kgs, which weight they reach at the age of 7.5 to 8 months⁶. Kostolac breeds were early matured, primitive breeds, gaining their weight later than the present highly cultivated selected ones.

All above stated has determined the conclusion that people within the period of Kostolac culture kept pigs due for

meat, which confirms their stock – breeding mentality.

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ARHEOZOOLOŠKA ANALIZA ZUBA DONJE ČELJUSTI SVINJA IZ KOSTOLAČKE KULTURE (3.250–3.000. PR. KR.) S VUČEDOLA I USPOREDBA S RECENTNIM

SAŽETAK

U radu su istraženi zubi 10 lijevih polovica mandibula recentnih krmača i zubi 18 mandibula porijeklom iz kostolačke kulture (3.250–3.000 pr. Kr.) s arheološkog lokaliteta Vučedol. Na svim je molarima prema Grantovoj metodi (Grant, 1982) određivan TWS (Tooth Wear Stage), kojem je dodan pripadajući numerički ekvivalent i zbrojem je dobiven MWS (Mandibular Wear Stage). Na temelju vrijednosti i raspona MWS-a za svaku je jedinku određena približna dob u trenutku smrti. Sve su recentne jedinke bile starije od 17 mjeseci, dok se dob kostolačkih jedinki kreće između 14 i 17 mjeseci.