

ON THE BEGINNING OF HORSE HUSBANDRY IN THE SOUTHERN BALKAN PENINSULA – THE HORSES FROM KIRKLARELİ-KANLIGEÇİT (TURKISH THRACE)

BALKAN YARIMADASININ GÜNEY KESİMİNDE AT YETİŞTİRİCİLİĞİNİN BAŞLANGICI – KIRKLARELİ (TRAKYA TÜRKİYE KESİMİ) – KANLIGEÇİT ATLARI

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Anahtar Sözcükler: Trakya (Türkiye kesimi), İlk Tunç Çağ, at yetiştiriciliği, arkeozooloji

ABSTRACT

The paper presents archaeozoological data on horse remains from the Early Bronze Age site Kırklareli-KanlIGEÇİT (Turkish Thrace). Because of the absence of wild horses in Thrace in the Mid-Holocene the bone finds from Kırklareli-KanlIGEÇİT can safely be assigned to domestic horses. According to radiocarbon dates on five of the horse bones, they date to the centuries between 2600 and 2300 cal BC. This is one of the earliest records of domestic horses in the southern Balkans. In comparison to other domestic mammals horses only represent a small part of the bone collection. Age determinations show that most horses were adult when they were slaughtered with animals seven to ten years old predominating. This seems to indicate that horses were primarily exploited as work animals, i.e., for riding, as pack animals, for traction, etc. The osteometric data point to quite a large and strongly built animals as the usual type of horse at this place and time. As local domestication can be ruled out, the Early Bronze Age horses from Kırklareli-KanlIGEÇİT must have been imported to Thrace from areas outside of this region. Metrical comparisons seem to favour Anatolia as a possible region of origin.

ÖZET

Bu yazıda, Kırklareli’nde, (Trakya) bir İlk Tunç Çağ yerleşmesi olan KanlIGEÇİT kazılarında bulunan at kemikleri ile ilgili arkeozoolojik veriler sunulmaktadır. Orta Holosen’de Trakya’da vahşi at bulunmadığı bilinmektedir; dolayısı ile, Kırklareli-KanlIGEÇİT’te bulunan at kemiklerinin tümü evcil türlere aittir. At kemiklerinden elde edilen radiokarbon tarihlemeleri bunların, uyarlanmış ¹⁴C olarak MÖ 2600 – 2300 yılları arasına ait olduklarını göstermektedir. Bu tarihler güney Balkan’lardaki evcilleştirilmiş at türü için elde edilen en eski yaşlardır. Diğer memeli hayvan kemiklerine göre at kemikleri, kemik buluntu topluluğunun küçük bir bölümünü oluşturur. Yaş saptaması ise atların çoğunun erişkin hayvanlar olduklarını ve daha çok 7-10 yaşındaki hayvanların kesildik-

lerini göstermektedir. Bu durum da bize Kanlıgeçit'deki atların öncelikle iş hayvanı olarak, örneğin binmek, yük taşımak ya da çekme işlerinde kullanılmış olduklarını, ancak yaşlandıktan sonra kesilmiş olduklarını göstermektedir. Atların kemik ölçüm verileri, iri ve kuvvetli yapıya sahip hayvanlar olduklarını ortaya koymaktadır. Atın evcilleştirilme sürecinin Trakya'da gerçekleşmediği kesin olarak bilindiğinden, Kırklareli – Kanlıgeçit İlk Tunç Çağ atlarının Trakya'ya başka bir yerden, evcilleşmelerini tamamladıktan sonra getirildikleri kesin olarak söylenebilir.. Kemik ölçümlerinden elde edilen sayısal verilere dayanarak yapılan karşılaştırmalar Kanlıgeçit atlarının Anadolu kökenli olduklarını göstermektedir.

INTRODUCTION

Even though the economic importance of the domestic horse today is quite limited, still public and scientific interest in horses is high. The main reason for the broad interest in horse domestication and the beginning of horse husbandry are the cultural importance and implications of the domestication of this animal. The domestication of the horse opened up wide possibilities for the use of animals for traction and transport. Here was an animal that could be exploited for its speed and staying power as a riding mount and which could also be used as a strong, versatile draught animal. Above all, the use of horses in this way completely revolutionized the transportation of people and goods in the prehistoric cultures of the Old World — just as the railway and the automobile did in the 19th and early 20th centuries (Clutton-Brock 1992). In addition, the availability of horses was linked to military innovations. Pictorial sources from the ancient Near East that are dated to the second millennium BC show that the horse was used from early times as a draught animal to pull chariots and as a mount for armed warriors (Azzaroli 1985: Fig. 22). Later, many ethnic communities established their power on the strength of their mounted armies. Historically documented invasions of Europe by mounted nomad warriors, such as the Scythians, the Avars, and lastly the Mongols in the 13th century under Jenghis Khan, are well known (Zimmer 1994: 35).

In recent years, there has been considerable progress in research on the origins of horse husbandry in the Old World. On the basis of newly excavated, well dated bone assemblages, the chronology of early horse keeping could already be fixed more precisely for some regions, including among others Western Europe (Uerpmann 1990; Uerpmann 1995), Central Europe (Benecke 1999, 2002), and the eastern Urals (Benecke and von den Driesch 2003; Outram *et al.* 2009). As the various studies show, the horse was lastingly established as a domestic animal

in those regions during the course of the third millennium BC. More recent palaeogenetic studies on horse bones from Eastern Europe and Western Siberia have demonstrated that horse domestication was accompanied by a rapid increase in coat color variation. Eight different coat colours have been found in Early Bronze Age horses from these areas (Ludwig *et al.* 2009). In contrast, there are still areas in Eurasia where the beginning of horse husbandry is still insufficiently documented. This is also true for the southern Balkan Peninsula, i.e., the area south of the Balkan mountains.

THE SOUTHERN BALKAN PENINSULA – STATE OF RESEARCH

The archaeozoological record known from Bulgaria so far does not provide clear information about when horses began to be used there as domestic animals. An early occurrence of domestic horses is assumed for the Ezero Culture (Early Bronze Age). This assumption is based on horse remains found at sites like Ezero (Bökönyi 1978: 52), Karanovo (Bökönyi and Bartosiewicz 1997: 399), and Michaliç (Ivanov 1950: 347). In all three cases, they are single bone finds, and whether they originate from wild or domestic horses is problematic as is also the dating. So far only bone finds from the Late Bronze Age document without doubt the presence of domestic horses in Bulgaria (Manhart 1998: 100). As for Greece, there still exist uncertainties about the chronology of early horse keeping. An extensive collection of horse remains has been reported from the mound of Kastanas (Macedonia), which comprises a long sequence of layers of the Bronze and Iron Ages (Becker 1986). At this site, horse remains begin to occur in the lower Early Bronze Age layers 25 and 22. On the basis of ceramics, these deposits can be correlated with layer I of the Ezero mound in Bulgaria (Aslanis 1985: Fig. 123), which accord-

ing to several radiocarbon dates chronologically belongs to the middle of the 3rd millennium cal BC (Görsdorf and Bojadžiev 1996: 137 pp.). Due to the postglacial absence of wild horses in Macedonia, the finds from Kastanas must represent remains of domestic horses. However, it has to be pointed out that the Early and Middle Bronze Age sequence of layers at Kastanas (layers 28-20) is disturbed by a ditch of the Late Bronze Age (Aslanis 1985: 24 pp.). Thus there is the possibility that the horse bones are intrusive from later deposits. Unfortunately, the questionable bones are no longer available for direct radiocarbon dating (C. Becker, personal communication); therefore their stratigraphy and / or chronology remain doubtful. Two other sites in Macedonia where horse remains have been reported from deposits of the Early Bronze Age are Vardaroftsa (Hančar 1955: 28) and Servia (Watson 1979: 229). Due to insufficient documentation of both assemblages, these finds cannot be used as evidence for the presence of domestic horses at this period.

From the late Early and Middle Bronze Age of Greece, horses are documented by bone finds from Tiryns (Early Helladic III; von den Driesch and Boessneck 1990), Lerna (Phase V, Middle Helladic; Gejvall 1969), Nichoria (Middle Helladic I; Sloan and Duncan 1978) as well as from Argissa-Magula (Boessneck 1962) and Pevkakia Magula (Hinz 1979). Some of these finds are regarded as possible later intrusions (Argissa-Magula, Pevkakia Magula). In deposits of the Late Bronze Age horse remains generally occur more frequently, e.g., in Kastanas, Tiryns and Lerna. In those times the horse was obviously already firmly established as a domestic animal.

An region of the southern Balkan Peninsula that has seen considerable archaeological research in recent years and hence from where large collections of animal remains from different prehistoric periods (Neolithic, Chalcolithic, Bronze Age) have been excavated and analyzed is Thrace and especially its central part (Benecke 2001). Among these newly excavated assemblages is an extensive collection of horse bones from sites near Kırklareli in the Turkish part of Thrace. Due to their early dating to the middle of the 3rd millennium BC, these materials are of great interest in relation to questions on the beginning of horse keeping in Thrace and, in addition to that, in the whole area of the southern Balkan Peninsula. The present article presents this material in more detail.

THE HORSE BONE ASSEMBLAGE FROM KIRKLARELİ

ORIGIN AND CHRONOLOGY

Since 1993 archaeological excavations – until 1998 as a joint German-Turkish project – have taken place on various sites on the southern outskirts of the provincial town Kırklareli in Turkish Thrace (Parzinger *et al.* 1999; Karul *et al.* 2003; Parzinger and Schwarzberg 2005). Research has focused and is still focusing here on the Neolithic mound site Aşağı Pınar. In addition, excavations were carried out in an area close to the Neolithic mound called Kanlıgeçit.

The site Kırklareli-Kanlıgeçit is a settlement mound of about 1,5 m height with an original extent of approximately 50 by 50 meters. Here, settlement remains of different periods were uncovered in an area of more than 1300 m². By far the greatest number of features and materials originate from the massive Early Bronze Age layers (1,2 to 1,4 m thick), where four settlement periods (Phase 1 – Phase 4) can be differentiated. Remarkably, remains of stone architecture (megarons, fortification) were found on the site (Fig. 1 and 2). They point to a special significance for the place at that time (e.g., an Acropolis). Large collections of animal remains were recovered from features of the Early Bronze Age, among them numerous horse remains. Concerning later periods, only the Iron Age is represented on the mound. Pits with Hellenistic and later ceramics that were dug into the deposits of the Early Bronze Age, belong to this period. Some of them also contained animal bones. Through single ceramic remains, earlier periods (Chalcolithic, Late Neolithic) could be verified on the site as well. However, distinctive settlement layers of those periods were not identified.

Since bone finds themselves give no clear indications regarding their chronology, the dating of the horse remains from Kırklareli-Kanlıgeçit must rely first of all on the accompanying ceramics. For this study only bones from such features were used that could be reliably assigned to the Early Bronze Age on the basis of the ceramics. As previously mentioned, structures of the Iron Age are present on both sites of Kanlıgeçit. The animal bones from pits of this period are characterized by a bright coloring and can usually be clearly differentiated on the basis of this character from those of the Early Bronze Age. Some bone assemblages with obviously mixed materials

were eliminated from consideration. Therefore, the possibility of an admixture of Iron Age horse remains in assemblages of the Early Bronze Age can be confidently excluded.

To check the chronological integrity of the Early Bronze Age horse bone material from Kırklareli-Kanlıgeçit, direct radiocarbon determinations were obtained from some of the specimens. The results are listed in Table 1. The dates confirm the contemporaneity of the horse bones with the ceramic materials and their dating to the Early Bronze Age. Due to a plateau of the ^{14}C -curve at 2550–2450 as well as at 2450–2300 years BC, the calibrated dates unfortunately show a wide range. The date for measurement KIA16209 is about 100 years younger than the others. This can be explained by an incomplete removal of contaminants from the collagen of the bone (P.M. Grootes, personal communication). If one transfers the five dates to the entire Early Bronze Age horse bone material, then the probable time period of its deposition is between 2600 and 2300 cal BC. Radiocarbon dates measured on charred plant remains from the mound confirm the centuries of the middle 3rd millennium cal BC as the period during which the settlement layers of this Early Bronze Age site were deposited (J. Görtsdorf, personal communication).

THE HORSES OF KIRKLARELI-KANLIGEÇIT – WILD HORSES OR DOMESTIC HORSES?

Horse bones from Holocene deposits on sites of the southern Balkan Peninsula, i.e., from areas south of the Balkan mountains, are generally regarded as remains of domestic horses. This is based on the assumption that this part of Southeast Europe did not belong to the postglacial range of the wild horse (*Equus ferus*). In fact, for some regions of this area, e.g., Thessaly and Macedonia, the available archaeozoological record confirms the undoubted absence of wild horses during the Early and Mid-Holocene. The question arises here whether this is also true for Thrace.

Due to the lack of faunal remains from the Epipalaeolithic and Mesolithic, we have no information concerning the occurrence of wild horses in Thrace during the early Postglacial. Only for the subsequent period, the Mid-Holocene, are collections of

animal bones available in larger numbers. For the Neolithic, 11 sites in Thrace can be cited from which archaeozoological analysis is published (Benecke and Ninov 2002). In none of the examined assemblages have horse remains been identified. In the Chalcolithic bone collections from Thrace, the presence of horses also could not be established. For evaluating the status of the horses from Kırklareli-Kanlıgeçit – wild or domestic – observations on the extensive bone samples of the neighbouring Neolithic tell mound site Aşağı Pınar are of special importance. These materials, which also include numerous bone finds of wild mammals, provide no evidence for the occurrence of *Equus ferus* (Benecke 1998a: Table 2). Based on this situation, wild horses seem not to have occurred during the Mid-Holocene in the vicinity of the site, i.e., in the southern foothills of the Istrandža-mountains. In the large Late Neolithic and Chalcolithic bone collections from sites at Drama (Thrace, Bulgaria), northwest of the Istrandža-mountains, evidence for wild horse is also missing, as recent studies show (Benecke 2001: 32).

The complete absence of horse bones in Neolithic and Chalcolithic faunal assemblages from Thrace either indicates that wild horses did not occur at all in this region during the mid-Holocene or that their numbers were so small that only in very rare cases did they become hunters' prey. The first possibility appears to be more likely. The Balkan mountains probably marked a natural boundary of distribution for *Equus ferus* in the Postglacial. North of the mountains, in the lower Danube area, wild horse is repeatedly documented by single bone finds in deposits of various Neolithic sites (e.g. Necrasov *et al.* 1967: Fig. 2).

From the above observations one can conclude that the Early Bronze Age horse remains from Kırklareli-Kanlıgeçit probably belonged exclusively to domestic horses. The material of this site can be regarded as the oldest stratigraphically and chronologically unambiguous evidence for the presence and keeping of domestic horses in the southern Balkan Peninsula.

FREQUENCY OF HORSES AT KIRKLARELI-KANLIGEÇIT

Table 2 presents the species composition of the mammal remains excavated from Kırklareli-Kanlıgeçit.

The faunal assemblage of this site is dominated by remains of the “classic” domestic mammals, i.e., cattle, sheep, goat and pig. Wild mammals are represented by 12 species, but their proportion in the assemblage is relatively small representing only 8%. Altogether 306 teeth and bones could be assigned to horses. With the exception of the oldest phases 5 and 6 (Chalcolithic, Late Neolithic), horse is present in all phases of occupation dating to the Early Bronze Age. Based on the number of identified specimens, its proportion in the assemblage is only 3,5% of all domestic species. This corresponds to expectations, since one can assume that horses were primarily exploited as work animals, i.e., for riding, as pack animals, for traction, etc., and only secondarily for food purposes. The results of age determination studies seem to corroborate this assumption, since most horses from Kanlıgeçit were adult when they were slaughtered, with animals of seven to ten years of age predominating (Fig. 3 and 4). Sex determination could be carried out on a few skull and pelvic bones. Nine specimens were identified to be from males and four from females, indicating a predominance of males (stallions or geldings) among the adult horses.

OSTEOMETRICAL EVALUATION AND ORIGIN OF THE HORSES FROM KIRKLARELİ-KANLIGEÇİT

Numerous measurements could be taken on the Early Bronze Age horse remains from Kırklareli-Kanlıgeçit (see Benecke 2002, Appendix). Overall the osteometric data reflect strongly built animals. Unfortunately, complete long bones are missing, so body size can only be very roughly estimated from breadth measurements. The majority of the animals will probably have achieved withers heights between 130 and 145 cm.

Figure 5 shows a metrical comparison between the horses from Kırklareli-Kanlıgeçit and those from the different settlement phases of Kastanas on the basis of logarithmic size index (LSI) distributions. The comparison shows that horses from Kanlıgeçit are more strongly built than those of the Late Bronze and Iron Age from Kastanas. The only measurable horse bone from Early Bronze Age layers at Kastanas (layer 25) morphologically resembles the series from Kanlıgeçit. Since its dating is uncertain (see above), this bone gives only tentative evidence that at Kastanas the Early

Bronze Age horses were relatively strongly built as well. As has already been pointed out, the presence of wild horses in Thrace during the Mid-Holocene can be excluded and thus also the possibility of local horse domestication. The earliest domestic horses of this region, which may have included the Early Bronze Age horses from Kırklareli-Kanlıgeçit, must therefore descend from horse populations the domestication of which took place outside Thrace. Two regions are primary candidates for consideration as possible areas of origin, i.e., Southeast or East Europe, and within those regions mainly the northwestern and northern Black Sea area, as well as Asia Minor (Anatolia). The horses from Kırklareli-Kanlıgeçit were compared with horses from those areas. Currently however, only a few series from both areas are available for metrical comparison (Table 3 and Fig. 5).

Unfortunately, for the lower Danube, i.e., the closest region to Thrace with an occurrence of wild horses in the Postglacial, metrical data on horse bones from sites dating to the Mid-Holocene (Neolithic, Chalcolithic) have not been published. Thus this area cannot at present be evaluated as a potential area of origin for the Early Bronze Age domestic horses of the southern Balkan Peninsula. To the east, from the neighbouring northwestern Black Sea area, an extensive collection of wild horses from Mirnoe near Odessa dating to the 6th millennium BC is available for metrical comparison (Benecke 1998b). The mean of this series clearly drops below the mean for the horses from Kırklareli-Kanlıgeçit (Fig. 5). Nearly the same applies to the wild horses from the Criș settlement of Sakarovka in Moldova (Table 3), which are roughly contemporaneous with the collection from Mirnoe. In comparison to the Early Bronze Age horses from Thrace, the horses of both sites were more lightly built. Therefore, one may probably exclude the Mid-Holocene wild horses from the regions of the rivers Dnestr and Prut as direct or indirect ancestors of the earliest domestic horses in Thrace. A greater morphological similarity exists with the horses of Dereivka, a site located at the lower Dnepr. Except for some intrusions from later periods, these animals represent wild horses of the northern Black Sea area from the late 5th and early 4th millennium BC (cf. Uerpmann 1990; Levine 1999). The Dereivka horses are, on average, similar in massiveness to the horses from Kırklareli-Kanlıgeçit. Con-

sidering the fact that horse domestication was probably accompanied by a reduction in body size and body weight (Nobis 1971: 54 pp.; Bökönyi 1974: 236; Uerpmann 1990: 125 pp.), then these wild horses seem not to have been sufficiently large or strongly built to be considered ancestors of the domestic horses from Thrace.

Morphological similarities seem to exist with horses from settlements of the Bell Beaker - Culture in the Carpathian basin (Fig. 5). The horses of this period, from which extensive collections are known from sites in the area of Budapest (Csepel Háros, Csepel-Hollandi útca, Szigetcsép-Tangazdaság I), are regarded as early domestic horses of that region (cf. Nobis 1971; Bökönyi 1978; Uerpmann 1990). As an example, Figure 5 shows the LSI-distribution for horses from Budapest-Csepel Háros. Compared to the horses from Kırklareli-Kanlıgeçit, there are only small differences in the mean value. This could point to a similar overall body shape. According to radiocarbon dates available from sites like Csepel Háros (Raczky 1992: 42), the Bell Beaker horses of Hungary are only slightly older than the Early Bronze Age horses from Thrace. Perhaps both groups of horses derive from the same area of origin.

From Anatolia two assemblages of domestic horses dating to the Bronze Age, Demircihüyük and Lidar Höyük, were used for a metrical comparison (Fig. 6). As the mean values of the LSI-distributions show, the horses of both sites are, on average, more lightly built than the horses from Kırklareli-Kanlıgeçit. However, since they partially originate from more recent periods of the Bronze Age, those assemblages are only partly comparable with the early domestic horses from Thrace. Another important group of horses for comparison are the Chalcolithic horses from Norşun-Tepe and Tülintepe in eastern Anatolia. According to radiocarbon dates for the Chalcolithic layers at Norşun-Tepe (di Nocera 2000: Table 2), they date to the second half of the 5th millennium and the beginning of the 4th millennium BC. Their status as either wild or domestic horses is differently evaluated; most authors hold these horses to be wild (cf. Boessneck and von den Driesch 1976; Uerpmann 1990). Two facts seem to support the latter claim, namely the early dating and morphological characteristics, particularly the low total

variability among those horses. As the statistical parameters in Table 3 demonstrate, the horses from Norşun-Tepe and Tülintepe represent very strongly built animals. The mean value of the LSI-distribution for this group of horses is clearly larger than that for the horses from Kırklareli-Kanlıgeçit. By taking into account a reduction of body size and body mass through domestication, the Anatolian wild horses could be considered as either the direct or indirect predecessors of the Early Bronze Age domestic horses from Thrace. Unfortunately, up to now series of metrical data for Mid-Holocene wild horses from the central and northwestern parts of Anatolia are lacking, so at the moment one cannot check to what extent those regions could have been a place of origin for the earliest domestic horses on the southern Balkan Peninsula as well.

CONCLUSIONS AND SUMMARY

The horse bones from Early Bronze Age layers of the Kırklareli-Kanlıgeçit site represent domestic horses, which were kept and bred in this area between 2600 and 2300 cal BC. Probably, they were predominantly exploited here as working animals; whether for riding, as pack animals or for traction is a question for which the bone finds themselves allow no answer. Pathologies or anatomical alterations resulting from use as working animals have not been observed on the bones. The osteometric data point to quite a large / heavy horse as the usual type of horses in this region.

The horses from Kırklareli-Kanlıgeçit undoubtedly document an early period of the appearance and exploitation of domestic horses on the southern Balkan Peninsula. Other evidence for horse keeping dating to the mid-3rd millennium in this region is both rare and for the most part plagued by uncertain chronology. The origins of horse husbandry in this part of Southeast Europe should chronologically not go back much further. This assumption is implied by bone assemblages from various sites in Thrace (e.g., Karanovo, Drama, Kırklareli) covering nearly all periods from the Early Neolithic until the Iron Age (Benecke 1998a: Table 1; Benecke 2001: 30). According to determinations on large bone collections from Cernavoda III-Culture settlements at Drama-Merdžumekja, horses seem not to have been present in the area during the last centuries of the

4th millennium BC. For the subsequent centuries of the first half of the 3rd millennium BC, bone assemblages, unfortunately, are present neither from Kırklareli nor from Drama, so that this period (Early Ezero Culture) cannot yet be judged regarding the occurrence of horses in Thrace for that period. From the middle of the 3rd millennium BC, the presence of horses is clear from the bone finds from Kırklareli-Kanlıgeçit discussed in this paper.

The earliest domestic horses of the southern Balkan Peninsula can not have originated locally due to the absence of wild horses. They must have derived from the horses of one or more other regions. As comparisons on the basis of LSI-distributions have shown, the origin of the Early Bronze Age horses from Thrace is difficult to ascertain using biometric characters. From the two regions that were considered here as likely possible places of origin, i.e., Southeast / East Europe and Anatolia, the first can apparently be eliminated. So far no wild horses are known from Southeast and East Europe that, according to their morphology (body shape), could be considered as founder (“parental”) populations for the strongly built domestic horses of Thrace. Even if the lower Danube area cannot be evaluated in this respect, it is rather unlikely that especially large and/or strongly built wild horses should have lived there. After all, this area represents „merely“ a western extension of the Pontic steppes. Therefore it could be expected that the Mid-Holocene wild horses of the lower Danube area would have approximately corresponded in phenotype (size and shape) to the contemporaneous populations of the northwestern and northern Black Sea area (Mirnoe,

Dereivka). Future investigations must show whether this ascription is correct. The currently available osteometric data seems to favour an Anatolian origin for the earliest domestic horses from Thrace. From Eastern Anatolia, wild horses are documented at Norşun-Tepe and Tülintepe that combine those morphological characters that must have been present in the founder (“parental”) populations of the early domestic horses from Thrace. Whether still other areas in Central or Northwestern Anatolia were potential areas of origin for those horses remains an open question. Probably only future a DNA analysis will provide better information about where the horses originated and how they came to the southern Balkan Peninsula.

The second half of the 3rd millennium BC seems not only to be an early period for horse husbandry on the Balkan Peninsula, but during those centuries the horse also spread within the Near East. As bone finds demonstrate, domestic horses occurred then for the first time both in Mesopotamia and in the Levant (Becker 1994: 159 pp.).

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REFERENCES

- Aslanis, I. 1985
Kastanas. Ausgrabungen in einem Siedlungshügel der Bronze- und Eisenzeit Makedoniens 1975-1979. Die frühbronzezeitlichen Funde und Befunde. Prähistorische Archäologie in Südosteuropa 4, Wissenschaftsverlag Volker Spiess, Berlin.
- Azzaroli, A. 1985
An Early History of Horsemanship. E.J. Brill/Dr. W. Backhuys, Leiden.
- Becker, C. 1986
Kastanas. Ausgrabungen in einem Siedlungshügel der Bronze- und Eisenzeit Makedoniens 1975-1979. Die Tierknochenfunde. Prähistorische Archäologie in Südosteuropa 5, Wissenschaftsverlag Volker Spiess, Berlin.
- Becker, C. 1994
 “Zur Problematik früher Pferdenachweise im östlichen Mittelmeergebiet”, B. Hänsel and St. Zimmer (eds.) *Die Indogermanen und das Pferd: 145-177.* Archaeolingua Foundation, Archaeolingua 4, Budapest.

Benecke, N. 1998a

“Animal remains from the Neolithic and Bronze Age settlements at Kırklareli (Turkish Thrace)”, H. Buitenhuis, L. Bartosiewicz and A.M. Choyke (eds.) *Archaeozoology of the Near East III*: 172-179. Arc-Publication 18, Groningen.

Benecke, N. 1998b

“Die Wildpferde aus der mesolithischen Station Mirnoe in der Südwest-Ukraine”, P. Anreiter et al. (eds.) *Man and the Animal World. Studies in Archaeozoology, Archaeology, Anthropology and Palaeolinguistics in memoriam Sándor Bökönyi*: 87-107. Archaeolingua Foundation, Archaeolingua 8, Budapest.

Benecke, N. 1999

“Pferdeknochenfunde aus Siedlungen der Bernburger Kultur - ein Beitrag zur Diskussion um die Anfänge der Pferdehaltung in Mitteleuropa”, M. Kokabi and E. May (eds.) *Beiträge zur Archäozoologie und Prähistorischen Anthropologie II*: 107-120. Gesellschaft für Archäozoologie und Prähistorische Anthropologie, Konstanz.

Benecke, N. 2001

“Die Tierwelt Thrakiens im Mittelholozän (ca. 6000–2000 v. Chr.) – anthropogene und natürliche Komponenten”, E. May and N. Benecke (eds.) *Beiträge zur Archäozoologie und Prähistorischen Anthropologie III*: 31-40. Gesellschaft für Archäozoologie und Prähistorische Anthropologie, Konstanz.

Benecke, N. 2002

“Die frühbronzezeitlichen Pferde von Kırklareli-Kanlıgeçit, Thrakien, Türkei”, *Eurasia Antiqua* 8: 39-59.

Benecke, N. and A. Von Den Driesch 2003

“Horse exploitation in the Kazakh steppes during the Eneolithic and Bronze Age”, M. Levine, C. Renfrew and K. Boyle (eds.) *Prehistoric Steppe Adaptation and the Horse*: 69-82. Cambridge University Press, McDonald Institute Monographs, Cambridge.

Benecke, N. and L. Ninov 2002

“Zur Nahrungswirtschaft der neolithischen Bevölkerungen im Gebiet des heutigen Bulgariens nach archäozoologischen Befunden”, M. Lichardus, J. Lichardus and V. Nikolov (eds.) *Beiträge zu jungsteinzeitlichen Forschungen in Bulgarien*: 555-573. Dr. Rudolf Habelt GmbH, Saarbrücker Beiträge zur Altertumskunde 74, Bonn.

Boessneck, J. 1962

“Die Tierreste aus der Argissa-Magula vom

präkeramischen Neolithikum bis zur mittleren Bronzezeit”, V. Milošević, J. Boessneck and M. Hopf (eds.) *Das präkeramische Neolithikum sowie die Tier- und Pflanzenreste*: 27-99. Die deutschen Ausgrabungen auf der Argissa-Magula in Thessalien 1, Rudolf Habelt Verlag, Bonn.

Boessneck, J. and A. Von Den Driesch 1976

“Pferde im 4./3. Jahrtausend v. Chr. in Ostanatolien”, *Säugetierkundliche Mitteilungen* 24: 81-87.

Bökönyi, S. 1974

History of Domestic Mammals in Central and Eastern Europe. Akadémiai Kiadó, Budapest.

Bökönyi, S. 1978

“The earliest waves of domestic horses in East Europe”, *Journal of Indo-European Studies* 6: 17-76.

Bökönyi, S. and L. Bartosiewicz 1997

“Tierknochenfunde”, St. Hiller and V. Nikolov (eds.) *Karanovo. Die Ausgrabungen im Südsektor 1984-1992 (Österreichisch-Bulgarische Ausgrabungen und Forschungen in Karanovo 1)*: 385-480. Verlag Berger & Söhne, Horn/Wien.

Bronk Ramsey, Ch. 1995

“Radiocarbon calibration and analysis of stratigraphy: the OxCal Program”, *Radiocarbon* 37: 425-430.

Clutton-Brock, J. 1992

Horse power: a history of the horse and the donkey in human societies. MA, Harvard University Press, Cambridge.

Driesch, A. and J. Boessneck 1970

“Die Tierreste von der mykenischen Burg Tiryns bei Nauplion/Peloponnes”, *Tiryns. Forschungen und Berichte* 11: 87-164.

Gejvall, N.-G. 1969

Lerna. A Preclassical Site in the Argolid I. The Fauna. American School of Classical Studies at Athens, Princeton.

Görsdorf, J. and J. Bojadžiev 1996

“Zur absoluten Chronologie der bulgarischen Urgeschichte”, *Eurasia Antiqua* 2: 105-173.

Hančar, F. 1955

Das Pferd in prähistorischer und früher historischer Zeit. Wiener Beiträge zur Kulturgeschichte und Linguistik 11, Verlag Herold, Wien.

Hinz, G. 1979

Neue Tierknochenfunde aus der Magula Pevkakia in Thessalien I. Die Nichtwiederkäuer. Universität München, Dissertation.

Ivanov, St. 1950

“Prinos kām vyprosa za domašnite životni prez kāsniya neolit i kamenno-mednata epoha u nas”, *Godišnik na Selsko-Stopanskata Akademija “Georgi Dimitrov” Sofija, Veterinarno-Medicinski Fakultet* 26: 345-354.

Karul, N., Z. Eres, M. Özdoğan and H. Parzinger 2003 *Aşağı Pınar I. Einführung, Forschungsgeschichte, Stratigraphie und Architektur*. Archäologie in Eurasien 15, Studien im Thrakien-Marmara-Raum 1, von Zabern, Mainz.

Kussinger, S. 1988

Tierknochenfunde vom Lidar Höyük in Südostanatolien (Grabungen 1979-86). Universität München, Dissertation.

Levine, M. 1999

“The Origins of Horse Husbandry on the Eurasian Steppe”, M. Levine et al. (eds.) *Late Prehistoric Exploitation of the Eurasian Steppe*: 5-58. McDonald Institute Monographs, Cambridge University Press, Cambridge.

Manhart, H. 1998

Vorgeschichtliche Fauna Bulgariens. Documenta naturae 116, München.

Necrasov, O., M. Ştirbu and M. Iacob 1967

“Răspîndirea unor mamifere sălbatice la începutul holocenului (neolitic) pe teritoriul României”, *Analele ştiinţifice ale Universităţii “Al. I. Cuza” din Iaşi, Secţiunea II (Ştiinţe naturale, a. Biologie)* 13: 311-319.

Nobis, G. 1971

Vom Wildpferd zum Hauspferd. Fundamenta, Reihe B, Band 6, Böhlau Verlag, Köln.

di Nocera, G.-M. 2000

“Radiocarbon Datings from Arslantepe and Norşuntepe: The fourth-third millennium absolute chronology in the Upper Euphrates and Transcaucasion region”, C. Marro and H. Hauptmann (eds.) *Chronologies des pays du Caucase et de l’Euphrate aux IV^e–III^e millénaires*: 73-93. Varia Anatolica XI, Institut Français d’Archéologie, İstanbul.

Outram, A.K. et al. 2009

“The Earliest Horse Harnessing and Milking”, *Science* 323: 1332-1335.

Parzinger, H., M. Özdoğan and N. Karul 1999

“An der Schwelle vom Orient zum Okzident”, *Antike Welt* 30: 325-336.

Parzinger, H. and H. Schwarzberg 2005

Aşağı Pınar II. Die mittel- und spätneolithische Keramik. Archäologie in Eurasien 18, Studien im Thrakien-Marmara-Raum 2, von Zabern, Mainz.

Raczky, P., E. Hertelendi and F. Horváth 1992

“Zur absoluten Datierung der bronzezeitlichen Tell-Kulturen in Ungarn”, *Bronzezeit in Ungarn*: 42-47. Ausstellungskatalog, Pytheas GmbH, Frankfurt/M.

Rauh, H. 1981

Knochenfunde von Säugetieren aus dem Demircihüyük. Universität München, Dissertation.

Sloan, R.E. and M.A. Duncan 1978

“Zooarchaeology of Nichoria”, G. Rapp and S.E. Aschenbrenner (eds.) *Excavations at Nichoria in Southwest Greece I. Site, Environs, and Techniques*: 60-77. Minnesota Press, Minneapolis.

Uerpmann, H.-P. 1990

“Die Domestikation des Pferdes im Chalkolithikum West- und Mitteleuropas”, *Madridrer Mitteilungen* 31: 109-153.

Uerpmann, H.-P. 1995

“Domestication of the Horse - When, Where, and Why?”, L. Bodson (ed.) *Le cheval et les autres équidés: aspects de l’histoire de leur insertion dans les activités humaines*: 15-29. Colloques d’histoire des connaissances zoologiques 6, Université de Liège, Liège.

Watson, J.P.N. 1979

“Faunal remains”, *The Annual of the British School at Athens* 74: 228-229.

Zimmer, St. 1994

“Die Indogermanen und das Pferd - Befunde und Probleme”, B. Hänsel and St. Zimmer (eds.) *Die Indogermanen und das Pferd*: 29-35. Archaeolingua 4, Archaeolingua Foundation, Budapest.

Lab-Number	Feature (layer)	Date radiocarbon years BP	Date calibrated years BC (1 σ)	Date calibrated years BC (2 σ)
KIA16208	31R/6 (Phase 1a/b-c)	3990 \pm 27	2566–2473	2573–2467
KIA16209	29R/16 (Phase 1c)	3858 \pm 27	2452–2236	2461–2209
KIA16210	31R/8 (Phase 1c-2a)	3966 \pm 38	2569–2458	2576–2346
KIA16211	30R/15 (Phase 1c-2a)	3957 \pm 26	2563–2460	2570–2348
KIA10326	31M/30 (Phase 2b)	3972 \pm 36	2566–2465	2578–2348

Table 1. Radiocarbon dates on horse bones from Kırklareli-Kanlıgeçit. Calibration was carried out with the help of the program OxCal (Version 4.1, IntCal04, Bronk Ramsey 2001).

Species	1	1–2	2	2–3	3	3–4	4	1–4	5	6
Domestic Mammals										
Cattle	20	143	722	710	620	496	432	3206	13	47
Pig	15	81	263	651	611	360	403	2477	5	34
Sheep/Goat	31	89	300	785	605	395	514	2803	5	52
(Sheep)	(3)	(10)	(39)	(120)	(75)	(55)	(73)	(385)	–	(10)
(Goat)	–	(2)	(5)	(16)	(15)	(5)	(12)	(56)	–	(2)
Horse	5	7	11	40	150	59	28	306	–	–
Dog	2	2	3	17	12	15	17	70	–	–
Wild Mammals										
Red deer (<i>Cervus elaphus</i>)	2	7	40	66	81	132	50	383	1	2
Red deer, antler –	–	7	8	16	5	2	39	–	1	–
Fallow deer (<i>Cervus dama</i>)	2	4	5	8	7	5	20	52	1	–
Fallow deer, antler	–	–	1	2	1	–	–	4	–	–
Roe deer (<i>Capreolus capreolus</i>)	–	2	–	5	2	7	6	23	–	–
Wild pig (<i>Sus scrofa</i>)	1	4	21	56	65	90	30	272	4	2
Aurochs (<i>Bos primigenius</i>)	–	–	8	12	8	26	3	57	–	–
Red fox (<i>Vulpes vulpes</i>)	–	2	1	3	3	1	6	16	–	–
Wild cat (<i>Felis silvestris</i>)	–	1	1	–	–	–	–	2	–	–
Brown bear (<i>Ursus arctos</i>)	1	–	6	1	3	2	4	17	–	–
Marten (<i>Martes spec.</i>)	–	–	1	–	1	–	–	2	–	–
Hare (<i>Lepus europaeus</i>)	1	1	–	10	3	–	2	17	–	–
Beaver (<i>Castor fiber</i>)	–	–	–	–	–	–	1	1	–	–
Dolphin (<i>Delphinus delphis</i>)	–	–	–	–	1	–	–	1	–	–

Table 2. Kırklareli-Kanlıgeçit. Species composition of the mammal remains according to phases of occupation (excavations 1994–1998, number of identified specimens).

Phase 1 – Early Bronze Age III/Middle Bronze Age (2200–2000 cal BC), Phase 2 – Early Bronze Age III (2450–2200 cal BC), Phase 3 – Early Bronze Age II (2650–2450 cal BC), Phase 4 – Early Bronze Age I, Phase 5 – Chalcolithic, Phase 6 – Late Neolithic.

Group	Mean	s	Min.	Max.	Med.	1. Qu.	3. Qu.	N
Mirmoe	0,0341	0,0165	-0,0092	0,0751	0,0363	0,0224	0,0452	113
Sakarovka	0,0312	–	-0,0110	0,0553	–	–	–	13
Dereivka	0,0469	0,0200	0,0057	0,0814	0,0526	0,0376	0,0595	50
Budapest, Csepel Háros	0,0479	0,0281	-0,0058	0,1115	0,0432	0,0255	0,0643	61
Kanlıgeçit	0,0506	0,0173	0,0071	0,0889	0,0514	0,0431	0,0619	62
Kastans, EBA	0,0691	–	–	–	–	–	–	1
Kastanas, LBA	0,0137	0,0212	-0,0243	0,0434	0,0153	-0,0014	0,0337	11
Kastanas, Iron Age	-0,0034	0,0165	-0,0349	0,0268	-0,0053	-0,0147	0,0092	30
Norşun-Tepe, Tülin-tepe	0,0641	0,0135	0,0368	0,0906	0,0663	0,0536	0,0725	16
Demircihüyük, EBA / MBA	0,0431	–	0,0087	0,0871	–	–	–	5
Lidar Höyük, MBA / LBA	0,0341	0,0265	-0,0081	0,0831	0,0302	0,0131	0,0584	22

Table 3. Statistical parameters for logarithmic size index (LSI) distributions in Figure 5. Abbreviations: s - standard deviation, Min. - Minimum, Max. - Maximum, Med. - Median, 1. Qu. - 1. Quartil, 3. Qu. - 3. Quartil, N - Number. Calculation of LSI according to Uerpman (1990).

References: Mirmoe (Benecke 1998b), Sakarovka (Benecke, unpublished), Dereivka (Uerpman 1990), Budapest, Csepel Háros (Uerpman 1990), Kanlıgeçit (Benecke 2002), Kastanas (Becker 1986), Norşun-Tepe and Tülin-tepe (Boessneck and von den Driesch 1976), Demircihüyük (Rauh 1981), Lidar Höyük (Kussinger 1988).

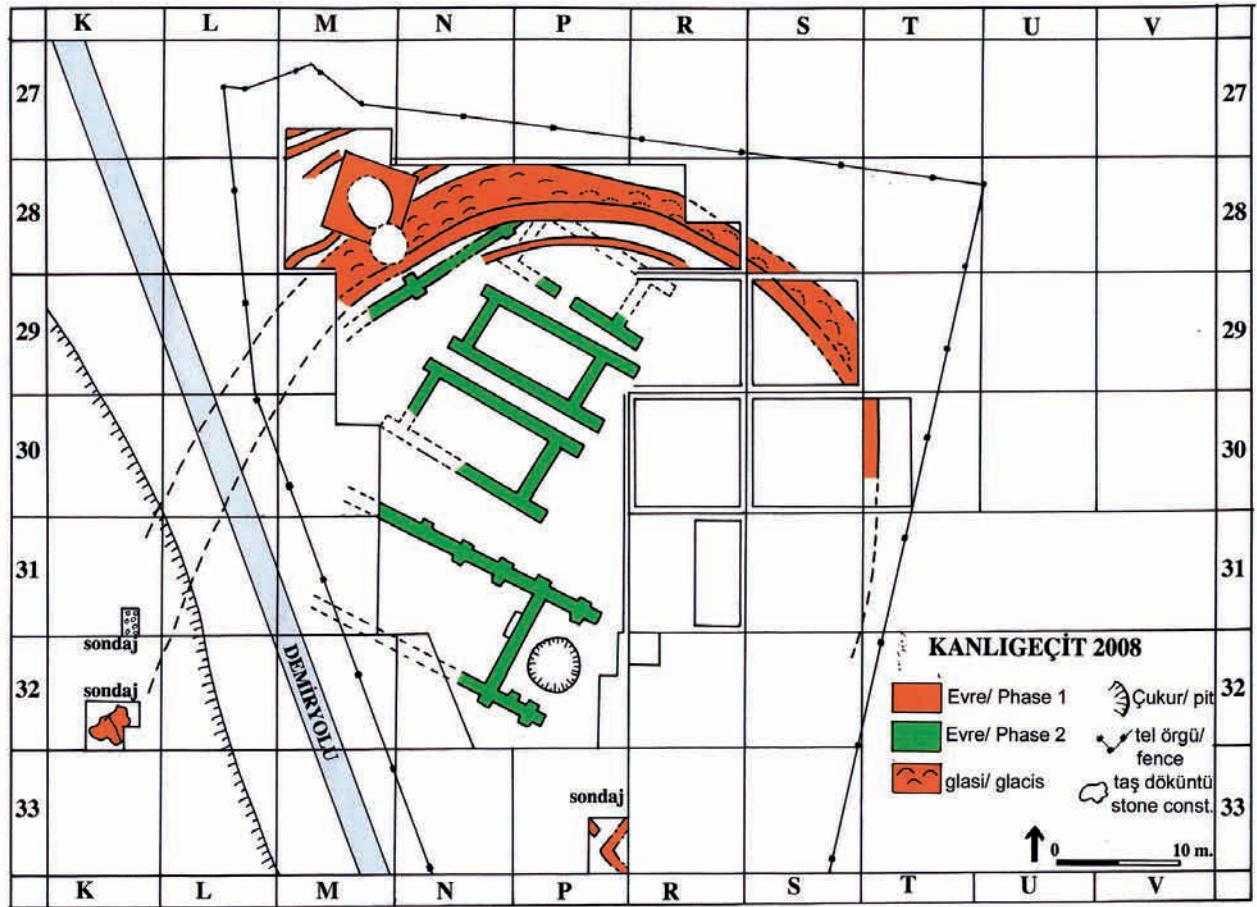


Fig. 1. Kırklareli-Kanlıgeçit. Plan of the excavated area in 2008 (Kırklareli Project Archive).



Fig. 2. Kırklareli-Kanlıgeçit. View of the three megarons from south-east (photo by M. Hochmuth, Berlin).



Fig. 3. Kırklareli-Kanlıgeçit. Left maxilla finds from pit 32P/25. The approximate age of death is ca 9–10, 7–8, 7–8, 4–5, 3–4 years (from left to right; photo by M. Hochmuth, Berlin).

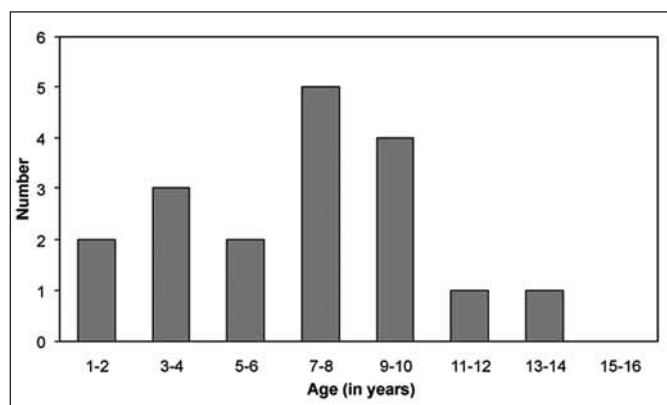


Fig. 4. Kırklareli-Kanlıgeçit. Age structure in horses based on dental eruption and wear

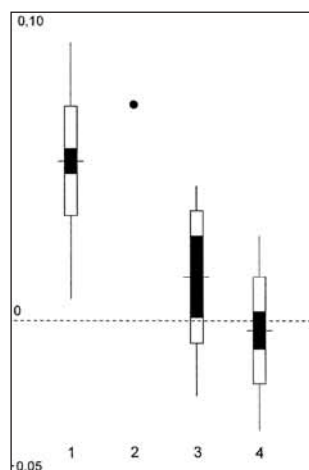


Fig. 5. LSI distributions for the Early Bronze Age horses from Kırklareli-Kanlıgeçit (1) and horses from Kastanas (2 – Early Bronze Age, 3 – Late Bronze Age, 4 – Iron Age). For statistics see Table 3.

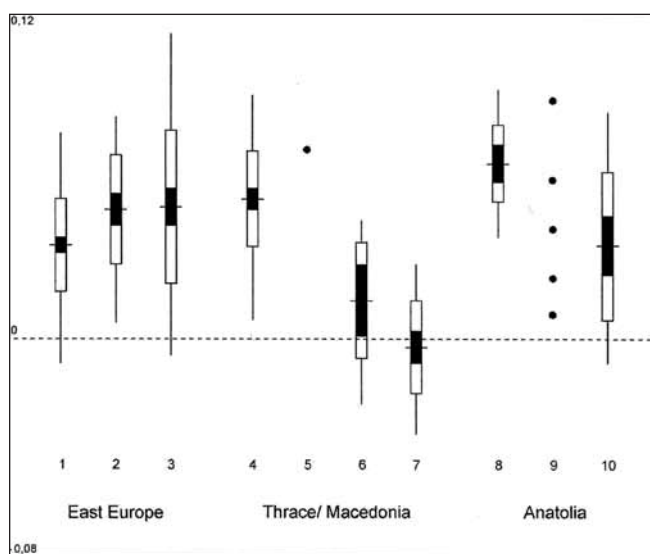


Fig. 6. LSI distributions for horses from East Europe (1 – Mirnove, 2 – Dereivka, 3 – Csepel Háros), Thrace and Macedonia (4 – Kırklareli-Kanlıgeçit, 5 – Kastanas, Early Bronze Age, 6 – Kastanas, Late Bronze Age, 7 – Kastanas, Iron Age) as well as from Anatolia (8 – Norşun-Tepe, Tülintepe, 9 – Demircihüyük, Early and Middle Bronze Age, 10 – Lidar Höyük, Middle and Late Bronze Age). For statistics see Table 3.