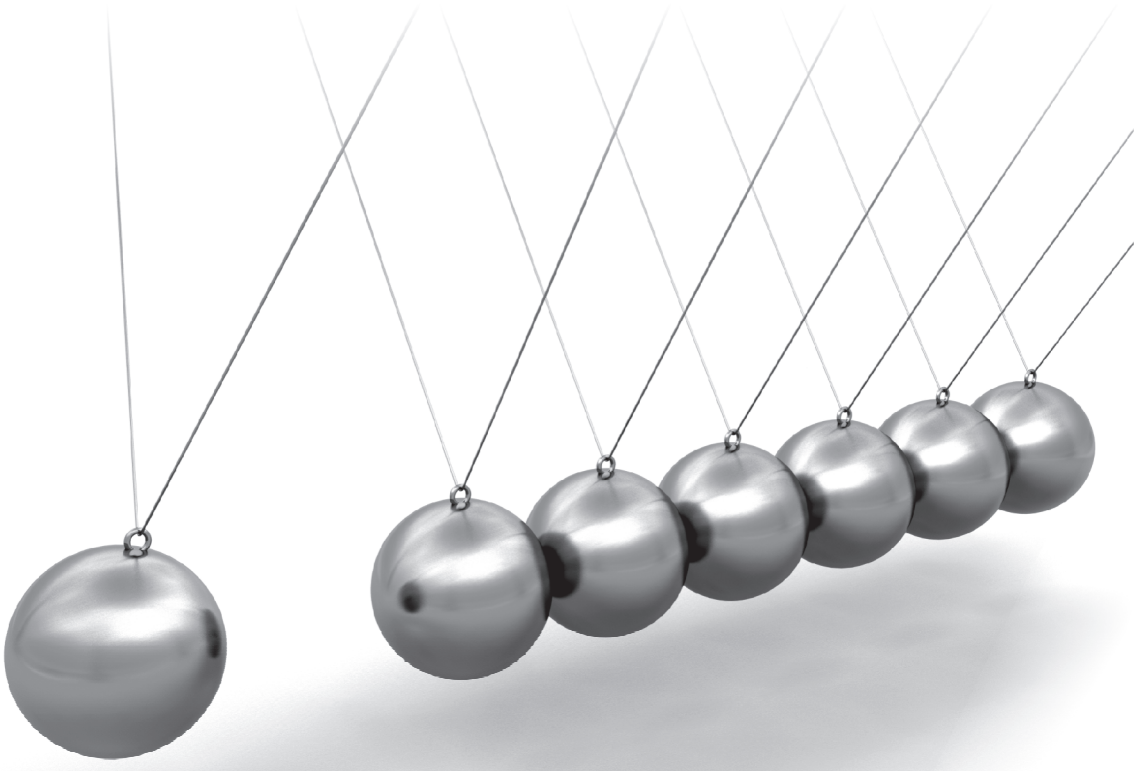
HUMANS AND SOCIETY IN TIMES OF CRISIS

Archaeology of Crisis

Edited by Staša Babić



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CONTENTS

EDITOR'S NOTE

In December 2019, a previously unknown coronavirus was registered and the severe and potentially fatal illness it causes swiftly spread around the world. On January 30, 2020, the World Health Organisation declared a state of Public Health Emergency, followed by the declaration of a pandemic on March 11 of the same year.[1] More than a year later, while this volume is submitted for publication, the world is still struggling with a plethora of severe problems initiated by, but by no means reduced to, the medical aspects of the current crisis. The disturbances in the economic and social activities further induce profound distress in everyday lives around the globe. Depending on the current state of the epidemic curve, we are advised to observe more or less rigorous measures of caution, most of them limiting our movements and contacts. While maintaining distance in the real world, we are connected virtually, various technologies enabling us to compare experiences of restricted interactions. One can thus get a glimpse of the diverse ways in which people around the world make sense of their changed worlds. Many express their thoughts in words, but some use other means. Like, a photo series that invites us to choose and arrange objects that are essential to us under the current predicament.[2] The similarities in created assemblages (an assortment of face masks, hand sanitizers, laptop computers, comfort food, books...), as well as idiosyncratic objects reflecting particular lifestyles (dog leash, musical instruments...), illustrate eloquently what archaeologists know so well: our lives are framed in materialities that shape and are being shaped by our practices. Under the drastically changed circumstances, such as the ones we are currently enduring, our relationship with our material surroundings also changes, creating new possibilities and constraints to our practices. Our present experiences are not unique and throughout the history of our species, human groups have faced various crises, caused by a wide range of factors. From massive changes in their environment, population movements and violent conflicts, to profound shifts in attitudes, beliefs and value systems, these events have caused disruptions in everyday practices of communities and have invariably been reflected in some material form.

1 https://www.who.int/emergencies/diseases/novel-coronavirus-2019

2 https://www.collater.al/en/paula-zuccotti-lockdown-essentials-photography/

Bearing this in mind, the purpose of this collection is to investigate some of the instances of crises that afflicted past populations of the Central Balkans and adjacent regions, via the material traces accessible through archaeological investigation. The knowledge of the causes of disruptions and of the responses devised for overcoming them in the past may bring us closer to solutions applicable in our present. At the same time, the aim of the volume is to offer an insight into the vast range of approaches currently practiced by archaeologists, their possibilities and limitations, as well as synergies created in the domains of theoretical concepts and methodological procedures. The authors share the same working environment – the Faculty of Philosophy in Belgrade, and specifically its Department of Archaeology – but follow diverse research paths, illustrating the current state of the discipline in general, its many theoretical and methodological ramifications. It is our hope that our specific disciplinary knowledge of the past may contribute to more efficient responses to crises in the present and future.

Belgrade, May/June 2021 Staša Babić

Sonja Vuković*

THE STORY OF A VANISHED CREATURE: EXTINCTION DYNAMICS OF THE AUROCHS FROM THE TERRITORY OF PRESENT-DAY SERBIA

Abstract: This paper analyzes archaeozoological data on globally extinct wild cattle (*Bos primigenius* Bojanus 1827) from the Holocene sites in Serbia through time, giving support to the research of its extinction dynamics. It is suggested that aurochsen were rare creatures in past landscapes of Serbia. At the onset of the Holocene, with climate changes, their habitats expanded, while they were hunted the most during the Neolithic. Since the Eneolithic, the number of their occurrences significantly declined, probably as a consequence of indirect anthropogenic influence. The fragmentary populations survived at least until the early Medieval period in Serbia.

Keywords: aurochs, *Bos primigenius*, Holocene, Serbia

Introduction

Some of the modern world crises are strongly related to the disruptions in the balance between humans and nature, as evidenced by, for example, a huge biodiversity loss, or "Earth's sixth mass extinction" event (Barnosky et al., 2011). Albeit the problem is a contemporary phenomenon, the awareness of the significance of studying the long history of interactions between humans and their environment for understanding and managing biodiversity problems is growing (Faith & Lyman, 2019). Archaeozoologists, who explore the history of human-animal relationships via the study of direct remains of animals from archaeological sites, provide baselines for wildlife conservation strategies. They also study the timing and causes of animal extinctions in the past, which is relevant for the comprehension of the general dynamics of biodiversity loss.

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The aurochs (*Bos primigenius* Bojanus 1827), a wild progenitor of domestic cattle, is one of the most intriguing globally extinct large mammal species. In the past, they occupied extensive forests, marshes as well as wet forests (Vuure, 2005, pp. 232–259). The fascination with the size and strength of this animal is evidenced by the multitude of archaeological and historical data, while several recent attempts on reviving the animal (e.g. Stokstad, 2015) point to the creature's enduring appeal. Although it is well known the last auroch died in 1627 in Poland (Vuure, 2005, and the references therein), the timing of the extinction in many European regions is quite vague. Recent extensive works on the paleoecology and history of aurochsen (Vuure, 2005; Wright, 2016), as well as particular studies on the Holocene mammal extinctions (Németh et al., 2017), dealt with the timing of aurochs extinction in different European regions. As for the lack of any synthesized dataset from the territory of modern-day Serbia, this region is not on the agenda of those contributions. Therefore, there is a necessity to synthesize and discuss the remains of aurochsen from this region from a diachronic perspective. By bringing together archaeozoological data on aurochs' occurrences throughout the Holocene, this paper aims to explore the extinction dynamics of the species in the territory of present-day Serbia.

Materials and Methods

For this study, published data on faunal assemblages from the Holocene archaeological sites in Serbia containing remains of wild cattle are assembled. The archaeological sites wherefrom aurochs remains are reported are grouped according to their regional zones and chronology. Regionally, the sites are grouped into two main geographical zones of Serbia, the Great Pannonian plain (GPP), which refers to Vojvodina, and Central Serbia (CS), which refers to the Central Balkan region, i.e. the part of the country located to the south of the rivers Sava and Danube. The chronological attribution of faunal assemblages is based on relative chronology, and the data are assigned to the following periods: Mesolithic[1] (MES), Early Neolithic (EN), Late Neolithic (LN), Eneolithic (ENE), Bronze Age (BA), Early Iron Age (EIA), Late Iron Age (LIA), Roman (ROM), Early Byzantine (EBY), and Early Medieval (EM). In order to trace the dynamics of the aurochs' extinction, the ratios of their remains are mutually compared between periods and regions. The species frequencies at

1 This timeframe corresponds to the faunal assambladges from the Mesolithic and "transitional" sequences of open air sites located in the Danube Gorges.

archaeological sites are not directly related to their biological populations but are the product of human preferences. However, as there are not any data that might point to the extinction dynamic other than bones from the sites, the research is based on the hypothesis that the general trends of wild cattle frequencies (increase/decrease) throughout time partly reflect their trends in original populations.

Aurochs in the Diachronic Perspective in Serbia

Aurochs remains were reported in 64 faunal assemblages originating from 51 Holocene archaeological sites in Serbia. The aurochsen frequencies for every site and assemblage are given in **Table 1**, while the regional and chronological comparisons are given in **Table 2** and **Figure 2**.

Table 1. Summary on Holocene sites in Serbia with aurochs finds
(* – the presence of aurochs is noted without quantification; ** – NISP is uknown)

No	Site/Citation	Region	Period	% aurochs	NISP (aurochs)	NISP (mammals)
1	Donja Branjevina (Blažić, 2005)	GPP	EN	1.90%	36	1926
2	Golokut (Блажић, 1984; Živaljević, 2017)	GPP	EN	4.90%	64	1306
3	Ludaš Budžak (Bökönyi, 1974)	GPP	EN	1.31%	32	2450
4	Magareći mlin (Stojanovski et al., 2020)	GPP	EN	0.33%	2	603
5	Nosa (Bökönyi, 1974, 1984)	GPP	EN	14.02%	136	970
6	Feudvar (Becker, 1991)	GPP	BA	0.57%	23	4051
	Feudvar (Becker, 1991)	GPP	EIA	0.59%	28	4759
7	Đepfeld – Doroslovo (Bökönyi, 1981)	GPP	EIA	4.65%	14	301
8	Čarnok (Blažić, 1992)	GPP	LIA	0.35%	**	**
9	Starčevo grad (Clason, 1980)	GPP	EN	3.20%	47	1450
10	At (Russell, 1993)	GPP	LN	12.50%	?	447

No	Site/Citation	Region	Period	% aurochs	NISP (aurochs)	NISP (mammals)
11	Opovo (Greenfield, 1986; Russel, 1993)	GPP	LN	1.37%	178	12964
12	Židovar (Radmanović et al., 2013)	GPP	LIA	*	**	**
13	Gradište – Iđoš (Molloy et al., 2020)	GPP	BA	1.44%	4	277
14	Gomolava (Clason, 1979; Orton, 2008)	GPP	LN	2.01%	118	5884
	Gomolava (Blažić, 1988)	GPP	EIA	0.31%	4	1306
	Gomolava (Blažić, 1992)	GPP	LIA	0.09%	**	**
15	Kudoš, Šašinci (Blažić, 2005)	GPP	ENE	0.86%	**	**
16	Žirovac, Ruma (Blažić, 1995)	GPP	ENE	2.08%	**	**
17	Gradina on Bosut (Bökönyi, 1981)	GPP	EIA	2.77%	9	325
	Gradina on Bosut (Blažić, 1992)	GPP	LIA	0.25%	**	**
18	Kalakača (Bökönyi, 1988a)	GPP	EIA	0.56%	15	2664
19	Dumbovo (Bökönyi, 1976)	GPP	ROM	0.64%	4	623
20	Boljevci (Lazić, 1988)	GPP	LN	1.14%	5	437
21	Hajdučka Vodenica (Greenfield, 2008)	CS	MES	2.44%	1	41
	Hajdučka Vodenica (Greenfield, 2008)	CS	EN	1.08%	2	185
22	Lepenski vir (Bökönyi 1969, 1970; Dimitrijević 2000, 2008; Borić & Dimitrijević, 2005)	CS	MES	4.31%	27	627
	Lepenski vir (Bökönyi, 1969, 1970)	CS	EN	8.91%	174	1953
23	Padina (Clason, 1980)	CS	MES	2.46%	28	1138
	Padina (Clason, 1980)	CS	EN	1.25%	8	639

No	Site/Citation	Region	Period	% aurochs	NISP (aurochs)	NISP (mammals)
24	Velesnica (Mikić, 1999)	CS	MES	*	**	**
25	Vlasac (Bökönyi, 1978)	CS	MES	0.60%	54	9275
26	Mihajlovac – Knjepište (Bökönyi, 1992)	CS	EN	3.25%	83	2554
27	Pontes (Bartosiewicz, 1996)	CS	EM	1.67%	41	2462
28	Vinča-Belo Brdo (Bulatović, 2018; Dimitrijević, 2006; Greenfield, 2014)	CS	LN	1.21%	85	7019
	Vinča-Belo Brdo (Greenfield, 2014)	CS	BA	2.44%	34	1394
29	Žarkovo (Schwartz, 1992)	CS	LN	0.40%	1	249
30	Grabovac – Đurića vinogradi (Bulatović & Spasić, 2019)	CS	EN	4.35%	3	69
	Grabovac – Đurića vinogradi (Bulatović & Spasić, 2019)	CS	LN	1.85%	2	108
31	Petnica (Greenfield, 1986; Orton, 2008)	CS	LN	0.45%	19	4228
	Petnica (Greenfield, 1986)	CS	ENE	0.40%	1	250
	Petnica (Greenfield, 1986)	CS	BA	0.50%	1	200
32	Crkvine-Mali Borak (Blažić & Radmanović, 2011)	CS	LN	0.88%	14	1595
33	Bukovačka česma (Greenfield, 1994)	CS	EN	1.50%	4	270
34	Drenovac (Dimitrijević, 2021)	CS	LN	0.08%	4	5149
35	Motel Slatina – Paraćin (Cvetković, 2004)	CS	LN	1.20%	3	249
36	Blagotin (Greenfield & Greenfield, 2014)	CS	EN	0.50%	44	8602

No	Site/Citation	Region	Period	% aurochs	NISP (aurochs)	NISP (mammals)
37	Divostin I (Bokonyi, 1988b)	CS	EN	4.00%	100	2401
	Divostin II (Bokonyi, 1988b)	CS	LN	6.00%	627	10785
38	Stragari-Šljivik (Greenfield, 2017; Radovanović 2020)	CS	LN	2.70%	88	3259
39	Ljuljaci (Greenfield, 1986)	CS	BA	1.55%	27	1743
40	Belovode (Dimitrijević & Orton, forthcomming)	CS	LN	0.34%	6	1780
41	Stubline (Bulatović, 2018)	CS	LN	0.64%	5	779
42	Livade (Greenfield, 1986)	CS	BA	0.20%	2	1033
43	Nad Klepečkom (Vuković & Marković, 2019)	CS	BA	0.40%	1	287
44	Bubanj (Bökönyi, 1991)	CS	BA	0.38%	1	263
	Bubanj (Bökönyi, 1991; Bulatović 2020)	CS	ENE	0.84%	34	4031
45	Pločnik (Bulatović, 2018)	CS	LN	0.25%	9	3636
46	Pavlovac (Dimitrijević, 2021)	CS	LN	0.18%	15	8458
47	Vitkovačko polje (Bulatović, 2011)	CS	LN	0.46%	2	439
48	Kale Krševica (Blažić, 2005)	CS	LIA	0.07%	3	4023
49	Niševac - Timacum Maius (Stojanović, 2013)	CS	ROM	1.10%	2	181
50	Jerinin grad – Brangović (Kukić & Mladenović, 2013)	CS	EBY	0.21%	2	949
51	Caričin grad (Marković, 2018)	CS	EBY	0.04%	7	16350

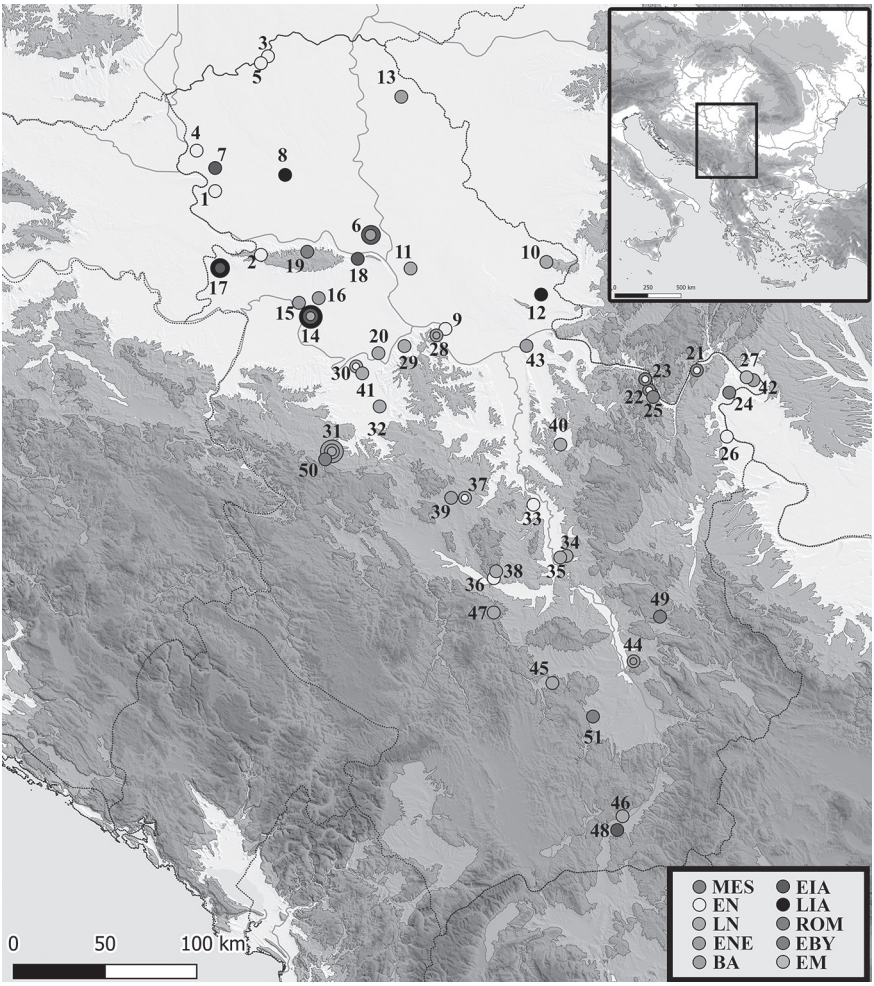

Figure 1. Holocene sites in Serbia with aurochs finds, colored by chronological groupings. Numbers match Table 1.

Unlike the finds of a large number of aurochs bones at some of the European sites since the Middle Pleistocene (Wright, 2016, and the references therein), the finds of aurochs remains are extremely rare in Pleistocene alluvial and cave deposits in Serbia (Dimitrijević, 1997, Dimitrijević personal comment). The global warming and humidity elevation at the onset of the Holocene brought about the expansion of the aurochs throughout the continent, and their bones in the Mesolithic deposits have been recovered in a wider area, but not in big numbers (Wright, 2016, p. 3). Aurochsen are reported at almost every Mesolithic open-air settlement

of fisher-hunter-gatherers located in the Danube Gorges, but their share is not large (0.6–4.31%). The highest incidence of aurochsen is reported at the site of Lepenski Vir (Bökönyi, 1969, 1970; Borić & Dimitrijević, 2005; Dimitrijević, 2000, 2008a). Among all the Mesolithic assemblages, red deer is by far the most common wildlife, while the relative proportions of wild cattle are usually even smaller than proportions of other common wild animals (wild boars, roe deer, brown bear, etc.).

Table 2. Number of published faunal reports (based on Bulatović & Stojanović, 2013; Bulatović & Filopović, in press; Mladenović & Mladenović, 2020; Radišić, 2020; Vuković, 2020) and sites with aurochs finds, and the relative proportions of aurochs by periods and geographical zone

	The Great Pannonian Plain					**Central Serbia**				
PERIODS	Number of published faunal assambladges	Number of faunal assambladges with aurochs	% aurochs (min)	% aurochs (max)	% aurochs (average)	Number of published faunal assambladges	Number of faunal assambladges with aurochs	% aurochs (min)	% aurochs (max)	% aurochs (average)
MES	0	0	/	/	/	6	5	0.6	4.3	2.45
EN	6	6	0.33	14.2	4.3	9	8	0.5	8.91	3.11
LN	4	4	1.14	12.5	4.26	15	14	0.08	6	1.19
ENE	5	2	0.86	2.08	1.47	10	2	0.4	0.84	0.62
BA	6	2	0.57	1.44	1.01	12	6	0.2	2.44	0.91
EIA	8	5	0.31	4.65	1.78	4	0	/	/	/
LIA	14	4	0.09	0.35	0.23	1	1	0.07	0.07	0.07
ROM	12	1	0.64	0.64	0.64	6	1	1.1	1.1	1.1
EBY	1	0	/	/	/	2	2	0.04	0.21	0.13
EM	6	0	/	/	/	1	1	1.67	1.67	1.67

The average ratios of aurochs in archaeological deposits increased after the Mesolithic, with the settling of farming societies in c. 6200 cal BC (Porčić et al., 2020). Aurochsen are reported at almost every Early Neolithic and Late Neolithic faunal assemblage in the region. In both regions the aurochsen ratios reached their maximum in the Early Neolithic,

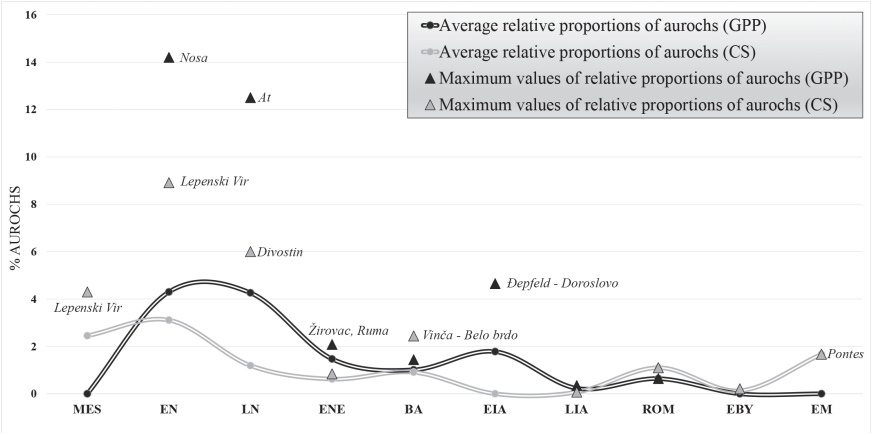

Figure 2. Changes in relative proportions of aurochs (% of NISP) throughout Holocene, by periods and geographical zone

whereas in both periods, the frequencies were bigger in the Great Pannonian Plain, probably as a consequence of different landscape settings. Their relative proportions in the majority of the Early Neolithic assemblages are less than 2%, and for several sites, they vary between 3% and 5%. Nonetheless, two assemblages stand out with a pretty high percentage of aurochs remains, namely the site of Lepenski Vir (8.91%) (Bökönyi, 1969, 1970) in the Danube Gorges, as well as the site of Nosa (14.02%) (Bökönyi, 1974; Bökönyi, 1984) in the Great Pannonian Plain. As both assemblages show the prevalence of wild mammals in relation to domesticates, a higher share of the aurochsen is not surprising. Still, wild cattle are not the most common wildlife at those sites, and they come after the red deer and wild boar at the site of Lepenski Vir, and after the European wild ass (*Equus hydruntinus*) at the site of Nosa. The share of aurochsen in the Late Neolithic period ranges between 0.1 and 2.7% within the majority of the assemblages, while the share of 6% at the site of Divostin (Bökönyi, 1988b) in Central Serbia and 12.5% at the site of At (Russell, 1993) in the Great Pannonian Plain seems to be exceptional. Interestingly enough, wild cattle are the most common wild species at the site of Divostin, while at the site of At their share is significantly smaller than the share of red deer. Both assemblages are dominated by domesticates, particularly domestic cattle. On the other hand, within the Late Neolithic sites that show the dominance of wildlife, such as Stragari – Šljivik (Greenfield, 2017; Radovanović, 2020), Petnica (Greenfield, 1986; Orton, 2008), and Opovo (Greenfield, 1986; Russell, 1993), the red deer is a dominant spe-

cies, whereas the small percentage of wild cattle is observed. The small relative proportion of aurochsen within wildlife-dominated sites, together with a strong correlation between wild and domestic cattle, observed by the analysis of the frequencies of different species in the Late Neolithic, led D. Orton (in press) to suggest the possibility that larger domestic cattle might have been misidentified as aurochsen. However, as many faunal assemblages with larger frequencies of wild cattle have been analyzed by S. Bökönyi, who was very experienced in working with remains of aurochsen (e.g. Bökönyi, 1962, 1972), the possibility that other analysts, who probably distinguished bones of wild/domestic cattle mostly according to size without employing more sophisticated methods that S. Bökönyi might have used (Bökönyi, 1962; Bökönyi, 1974, pp. 107–109), missed some aurochsen, seems to be reasonable too. One plausible explanation for the more common occurrence of aurochsen within cattle-dominated assemblages is that cattle herders might have met aurochs more often, as aurochs used to use the same feeding grounds as domesticated cows (Vuure, 2005). Undertaking the large-scale examination of biometrics of those animals from different sites and periods might help to resolve the problem of possible wild/domestic cattle (mis)identifications.

Within the Eneolithic, which started in the region c. 4500 cal. BC (Bulatović & Vander Linden, 2017), the relative proportion of sites with wild cattle remains significantly declines, while the ratio of their bones decreases in both regions, as their share within almost every assemblage is less than 1%, including the wildlife-dominated assemblage from the site of Petnica (Greenfield, 1986). The biggest share of wild cattle (2.08%) in the Eneolithic comes from the site of Žirovac, Ruma (Blažić, 1995)[2]. The decline of occurrences of wild cattle during the 5th millennium BC is also observable within some multilayered sites, such as the site of Petnica (Greenfield, 1986, p. 215) where a decline of the relative proportion of aurochs occurs throughout the Late Neolithic, while at the site of Bubanj (Bulatović, 2020, Tab. 4) a decline is observable after the Early Eneolithic. If this decline reflects the decrease in biological populations of this animal, this gives rise to the question what brought to the decline of their population during the 5th millennium BC. It is suggested that overhunting and ousting the aurochs from their feeding grounds by introducing domestic cattle brought to their decline and final extinction (Vuure, 2005, pp. 72–78). As no Neolithic/Eneolithic site revealed a considerable number of wild cattle bones, as in nearby Hungary, where specialized aurochs hunting in the Late Neolithic occurred (Bökönyi, 1974, p. 50), the sug-

2 It is worth mentioning that for this site NISP is not reported, but only ratios of identified animals in percents.

gestion that the animals were overhunted is plausible only if really small populations of these animals occupied this region. Indirect anthropogenic factors, such as proposed ousting, as well as landscape changes, seem possible too. The human impact on Neolithic and Eneolithic landscapes, such as forest clearance, is well documented in the Balkans and the Great Pannonian Plain (Chapman, 2018). However, more regional environmental data is needed to support the link between landscape changes and the decrease of the wild cattle bones at archaeological sites.

During the Bronze Age, similarly as in the Eneolithic, the number of sites with wild cattle bones is small, compared to the number of published archaeozoological data. The frequencies of wild cattle continue to decrease, as they amount to mostly less than or around 0.5%, whereas they reach somewhat higher ratios at several sites. The highest ratio is observed at the site of Vinča – Belo brdo (Greenfield 2014). From the Early Iron Age faunal collections, the aurochs are reported only at sites in the Great Pannonian Plain. Their proportions stay modest (around 0.5%) at most of the sites, whereas they are unexpectedly high at the sites of Đepfeld at Doroslovo (4.65%) and Gradina on Bosut (2.77%) (Bökönyi, 1981). The observed increase of the average relative proportion of aurochs for this period is probably biased by the small sizes of faunal collections, and by inadequate bone collecting (Bökönyi, 1981, p. 106).

Although remains of domestic animals, especially cattle, mostly prevail at the Late Iron Age sites, the frequencies of wild mammals within some of the sites, especially of red deer, testify that hunting was a significant activity (Radišić, 2020). However, aurochs remains are reported from just a small number of published Late Iron Age assemblages, and their shares continue to decrease, as they vary between 0.07 and 0.35%. The number of Roman period sites with remains of aurochs is very small. Although the average value for the proportions of aurochs is somewhat higher than in the Late Iron Age, this "increase" is probably biased by a small sample size from the site of Niševac (Stojanović, 2013). A modest number of the Late Iron Age and Roman period sites with wild cattle bones, together with the low proportion of their bones, is possibly related to their rare occurrences in the regional habitats. It is logical to suggest that the spreading of arable lands and deforestation during the periods in question brought to the further retreat and decline of aurochsen populations. Since the Early Byzantine period, wild cattle have been lacking from the Great Pannonian Plain, and they have been discovered within the fortification at the site of Jerinin Grad, Brangović (Kukić & Mladenović, 2013) (5^{th}–6^{th} c. AD), as well as within the settlement (dated between 578 and 615 AD) excavated at the site of Caričin Grad (Marković, 2018). Although the rela-

tive proportion of the Early Byzantine sites with aurochs remains is high, it should be noted that the number of analyzed faunal collections is scarce.

Finally, the last aurochs remains from the region come from the Early Medieval settlement excavated at the site of Pontes in the Danube Gorges, which date back between the 9th and 12th century AD (Bartosiewicz, 1996). Considering the particularities of the landscape of the Danube Gorges hinterlands, even extant biodiversity hotspot, that consists of wet forests, a favorable habitat of wild cattle (Vuure, 2005), and the last aurochs finds from this region, it is possible that some of the last populations of the animal survived in the forests of Eastern Serbia. The faunal analysis from other contemporaneous and later medieval sites (Mladenović & Mladenović, 2020) showed that mostly red deer, wild boars, and hares were hunted, with no more evidence of wild cattle existence written in bones. On the other hand, there are historic records from medieval Serbia that might be related to this animal. *The Hagiography of St. Simeon*, written by Stefan Nemanjić, which dates back to 1216 AD, mentions wild cows and bulls, which the Serbian Grand Prince Stefan Nemanja (St. Simeon) received as a present from the Hungarian king Andrew II (Milisavac, 1970, p. 114). Later historic records from the 13th/14th century have mentions of toponyms that are generally considered to derive from the Slavic name for this animal (*tur*), while current toponyms from Serbia, such as *Turija, Turjane, Turica* (Mladenović, in preparation, and the references therein) if related to aurochsen, show that this vanished creature was remembered for a long time.

Conclusions

The compilation and analysis of aurochs' occurrences in the Holocene faunal assemblages from the territory of Serbia enabled the understanding of the aurochs' presence and prevalence in the region. As for the generally small relative proportion of the aurochs compared to other wild mammals, it is concluded that the animal was rarely hunted in the region throughout its existence, and consequently, it might be suggested that small populations of aurochsen occupied the region of Serbia in the Holocene past. However, the observed differences in their relative proportions throughout time and regions point to the specificities of their extinction dynamics. At the beginning of the Holocene, as a consequence of climate changes, and the prevalence of wet forests, a favorable habitat of the aurochsen, the species expanded in the region. They were most hunted during the Neolithic, albeit in smaller numbers than other wildlife. Based on their common occurrence in the Mesolithic and Neolithic

assemblages, the suggestion is that the aurochs' populations were more numerous during the Early and Middle Holocene in the region. Their more common and more intense presence in the Great Pannonian Plain than in Central Serbia during the Neolithic is probably related to landscape features. A significant decline in their population might be suggested since the Eneolithic, i.e. the mid-5th millennium BC, while further decline is observed in the forthcoming periods. Finally, fragmentary populations of the species survived at least until the Early Medieval period, which corresponds to the proposed extinction dates in nearby Hungary and Romania (Németh et al., 2017, and the references therein). The suggestion is that the populations of aurochsen declined until their final extinction due to indirect anthropogenic pressure (ousting, deforestation, spreading of arable lands), while the data on overhunting of this animal is absent.

Albeit the study answered the questions related to the extinction dynamics of aurochs, it opened other important questions, relevant for the understanding of the paleoecology of the species. Therefore, the suggestion for future research is to analyze the temporal changes in size and morphology of aurochsen, to better understand its ecology, as well as to contribute to wild/domestic cattle size groupings. A joint discussion of the observed extinction dynamics and other paleoenvironmental data, related to particular landscape features, might provide a better understanding of the extinction causes. Isotopic analysis of aurochsen remains would also be useful in understanding the intensity of the anthropogenic pressure on this animal.

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Соња Вуковић*

ПРИЧА О ИШЧЕЗЛОМ СТВОРЕЊУ: ИЗУМИРАЊЕ ДИВЉЕГ ГОВЕЧЕТА СА ПРОСТОРА ДАНАШЊЕ СРБИЈЕ

Апстракт: Рад се бави проучавањем динамике изумирања дивљег говечета (*Bos primigenius* Bojanus 1827) на територији Србије на основу анализе археозоолошких података из периода холоцена. Претпостављено је да је дивље говече представљало ретку врсту, која је насељавала пејзаже Србије у прошлости. Почетком холоцена, када је дошло до климатских промена, хабитати ове врсте су проширени. Дивље говече највише је ловљено током неолита, док у енеолиту њихов број значајно опада, највероватније услед посредних утицаја човека. Мање популације ових животиња преживеле су у Србији најмање до раног средњег века.

Кључне речи: дивље говече, *Bos primigenius*, Холоцен, Србија

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While writing the texts collected in this volume, the authors have been living through an extraordinary experience, coping with everyday tasks made more complex by the crisis we have been facing, and creating new habits necessary to navigate the new environment. Although exceptional from our point of view, our present experience is far from unique, and the human history is replete with turbulent periods of crisis, profoundly disrupting the habitual order.

The aim of this collection is therefore to investigate some of the situations of crisis in the past from the archaeological perspective, in a search for insights that may help us to better understand and cope with the present one. At the same time, the papers demonstrate some of the vast possibilities of archaeological investigation to contribute to our understanding of the world we live in, as well as of the past societies whose material traces we study.

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