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BILJNI OSTACI S ČETIRI NOVOISTRAŽIVANA LOKALITETA ĐAKOVŠTINE

UDK: 903.28(497.5-37 Đakovo)''634/636''
Pregledni rad

Analize biljnih ostataka s arheoloških lokaliteta vrlo su važan segment rekonstrukcije ekonomije prošlih populacija, što je osobito slučaj s pretpovijesnim lokalitetima na kojima se rijetko očuvaju drugi segmenti svakodnevnih aktivnosti. U tekstu su prikazani rezultati i interpretacija biljnih ostataka s četiri novoistraživana lokaliteta Đakovštine, i to s obzirom na kulture neolitika i bakrenog doba. Starčevačka kultura ustanovljena je na lokalitetu Pajtenica-Velike Livade, sopotska na lokalitetu Ivandvor-Šuma Gaj, lasinjska na lokalitetima Pajtenica-Velike Livade i Jurjevac-Stara Vodenica, a kostolačka kultura na lokalitetu Đakovo-Franjevac. Biljni ostaci raspoređeni su u sedam kategorija koje sadrže podskupine, određene prema vrsti biljke, a podjela se temelji na konkretnim nalazima s navedenih lokaliteta. S obzirom na to da su lokaliteti u istoj mikroregiji, mogla se napraviti usporedba rezultata s obzirom na vrijeme i kulturne pojave. Najmanji broj vrsta ustanovljen je analizama ostataka pripisanih najranijoj, starčevačkoj, a najveći najkasnijoj, kostolačkoj kulturi (najširi

PLANT REMAINS FROM FOUR NEWLY EXCAVATED SITES IN THE ĐAKOVO REGION

UDC: 903.28(497.5-37 Đakovo)''634/636''
Review

Analysis of plant remains from archaeological sites is an extremely important procedure in reconstructing the economies of past populations, which is especially the case with prehistoric sites, where other aspects of everyday life are rarely preserved. In this paper, the author presents the results and interpretations of analysis of plant remains from four newly excavated sites in the Đakovo region, with respect to archaeological cultures dated to the Neolithic and Copper Age periods. The Starčevo culture is present at Pajtenica-Velike Livade, the Sopot culture at Ivandvor-Šuma Gaj, the Lasinja culture at Pajtenica-Velike Livade and Jurjevac-Stara Vodenica, and the Kostolac culture at Đakovo-Franjevac. Plant remains are placed in seven categories which contain subgroups according to plant species, and the division is based on finds from the aforementioned sites. Since the sites are in the same micro-region, it was possible to compare results with respect to period and culture. The fewest plant remains were found in the context of the earliest, Starčevo, culture, and the most (widest spectrum of grains, pulses, weeds and fruits) in the most recent, Kosto-

spektar žitarica, mahunarki, trava i voća). Rezultati analiza pokazuju kontinuitet u korištenju žitarica, poput pšenice i ječma, kao i divljih vrsta, kroz razdoblja neolitika i eneolitika, ali se s vremenom taj spektar i povećava. U kontekstu s drugim vrstama nalaza s lokaliteta, biljni ostaci ukazuju na postojanje intenzivne/vrtne zemljoradnje te na to da su biljke obrađivane u proučavanim naseljima.

Ključne riječi: neolitik, eneolitik, Đakovština, arheobotanika, biljni ostaci, starčevačka kultura, sopotska kultura, lasinjska kultura, kostolačka kultura

lac, culture. The finds show continuity in the use of cereals such as wheat and barley, as well as wild species throughout the Neolithic and Copper Age, but the spectrum widens with the passage of time. In combination with other types of finds from the sites, the plant remains suggest the existence of intensive or garden, rather than extensive, agriculture, and that plants were processed inside the settlements studied.

Key words: Neolithic, Copper Age, the Đakovo region, archaeobotany, plant remains, the Starčevo culture, the Sopot culture, the Lasinja culture, the Kostolac culture

Arheološki muzej u Zagrebu, u razdoblju od 2006. do 2008. godine, proveo je zaštitna istraživanja na šest lokaliteta na koridoru 5C, trase autoceste Beli Manastir – Osijek – Svilaj.¹ U tekstu će biti prikazani rezultati analiza biljnih ostataka s četiri nalazišta: Đakovo-Franjevac, Ivandvor-Šuma Gaj, Jurjevac-Stara Vodenica te Pajtenica-Velike Livade. Svi lokaliteti nalaze se na prostoru Đakovštine koja obuhvaća istočne ogranke Dilja i Krndije, glavninu Đakovačkog prapornog ravnjaka i uske pojaseve susjednih nizina, na sjeveru do međašnje Vuke, a na jugu do Biđa-Bosuta.² U analizu će biti uključeni samo oni uzorci koji potječu iz stratigrafskih jedinica datiranih u razdoblja neolitika i eneolitika, s ciljem utvrđivanja koje su biljke koristile te populacije. Svi uzorci potječu iz ukapanih objekata, kao što su jame, koje su sadržavale materijal što ga je moguće datirati, primjerice keramiku, kamene alatke, kost ili ugljen, kako bi se dobili pouzdani podaci.³

¹ Balen 2008b, 6.

² Sić 1975, 162.

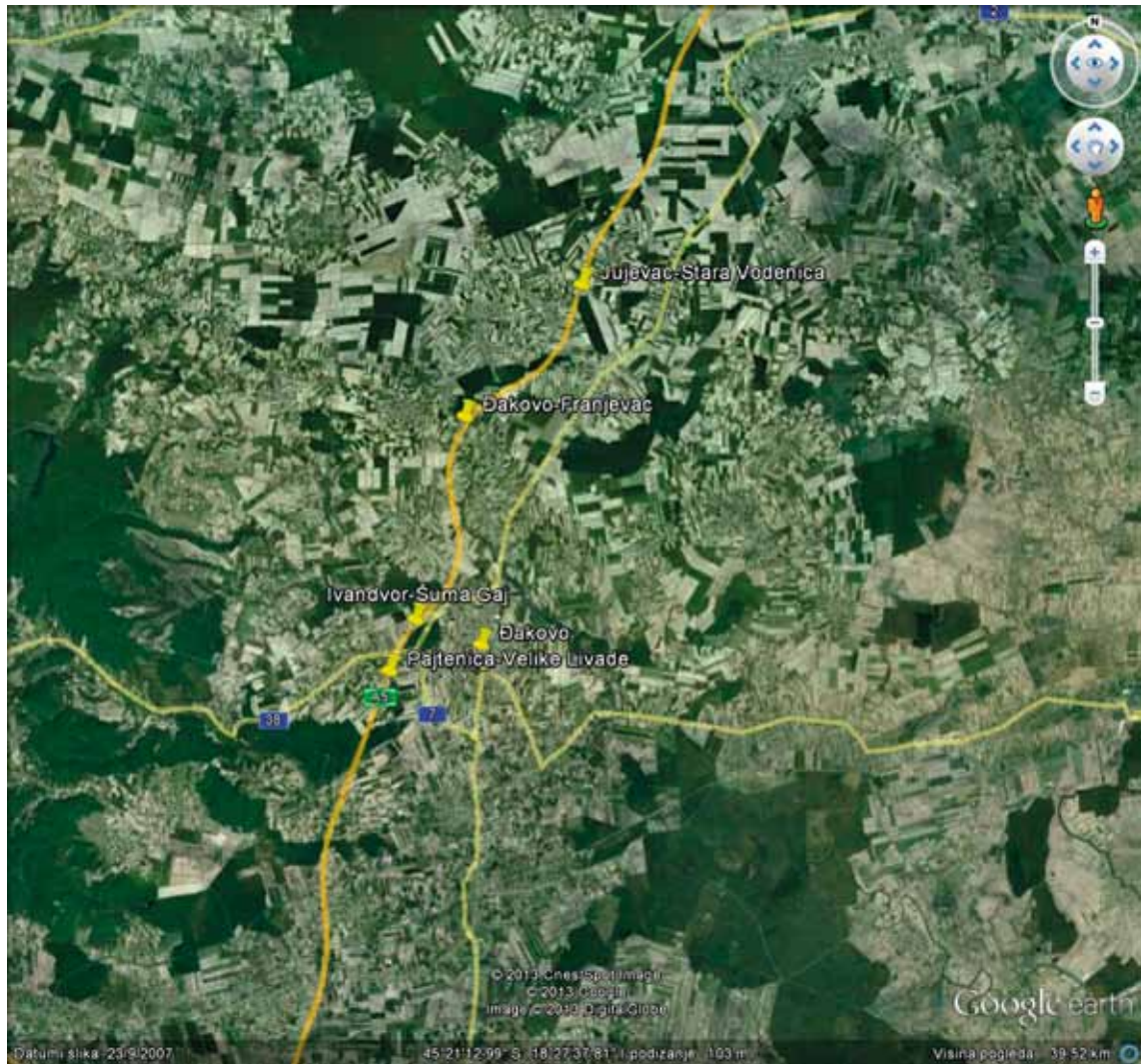
³ Reed 2012, 37.

The Archaeological Museum in Zagreb conducted rescue excavations on six sites in the 5C corridor of the A5 motorway (Beli Manastir – Osijek – Svilaj) between 2006 and 2008.¹ This paper brings the results of plant-remains analyses from four of those sites: Đakovo-Franjevac, Ivandvor-Šuma Gaj, Jurjevac-Stara Vodenica, and Pajtenica-Velike Livade. All the sites are located in the Đakovo region, which includes the eastern parts of the Dilj and Krndija hills, the greater part of the Đakovo loess plain and narrow strips of the neighbouring valleys, reaching northwards to the River Vuka, and southwards to the Biđ-Bosut.² The analyses include only remains dated to the Neolithic and Copper Age periods, with the aim of examining which plants were used by the population. All samples presented originated from dug-in features such as pits containing datable artefacts, such as pottery, stone tools, bone and charcoal, in order to provide reliable environmental information.³

¹ Balen 2008b, 6.

² Sić 1975, 162.

³ Reed 2012, 37.



Karta / Map 1: Lokalizeti na autocesti A5 u odnosu na grad Đakovo / Sites on the A5 motorway in relation to the town of Đakovo (©Google maps, prilagodio autor / adapted by the author)

Neolitik

Neolitik je razdoblje pretpovijesti tijekom kojeg se događaju velike promjene u organizaciji gospodarskog i društvenog života, kao i u materijalnoj kulturi. U našim krajevima ovo razdoblje traje od otprilike 6000. do 3500. pr. Kr., a na čijem se početku događaju klimatske promjene koje pogoduju rastu i uzgoju biljaka.⁴ Tada se u potpunosti mijenja način života prijašnjih lovačko-sakupljačkih populacija, koje prelaze na sjedilački način ži-

⁴ Gyulai 2007, 125.

The Neolithic

The Neolithic is a period of prehistory marked by great changes in the organization of both economic and social life, as well as in material culture. In the region discussed, this period lasts roughly from 6000 to 3500 BC, and its beginning is marked by climate changes which serve the growth and cultivation of plants.⁴ This is a period in which the way of life was completely transformed. Hunter-gatherer populations moved to a sedentary way of life and started to engage in

⁴ Gyulai 2007, 125.

vota, te se počinju baviti poljoprivredom i stočarstvom,⁵ osiguravajući time stalan izvor hrane.⁶ Ipak, zbog složenosti situacije, treba imati na umu da se ovakvi procesi ne mogu objasniti jednom univerzalnom teorijom.⁷ S obzirom na to, prvotno prihvaćanje kultiviranih biljnih vrsta nije moglo biti jednosmjerni proces kojim su se kultivirane biljke širile svijetom isključivo zbog svojih svojstava,⁸ već se radilo o procesu koji je uključivao i druge aspekte društva, u smislu društvene i ekonomske organizacije, a koje su se očitovale u promjeni organizacije i strukture naselja.

Na proučavanim lokalitetima ovo će se razdoblje promatrati kroz dvije kulturne pojave – starčevačku i sopotsku kulturu. Starčevačka kultura ustanovljena je na lokalitetu Pajtenica-Velike Livade, a sopotska na lokalitetu Ivandvor-Šuma Gaj.

Dva naselja starčevačke kulture na lokalitetu Tomašanci-Palača pripadaju njezinoj kasnoj fazi, a dobiveni datumi su u rasponu od 5660. do 5300. pr. Kr. Na lokalitetu Pajtenica-Velike Livade za starčevačku kulturu datumi padaju u isti raspon.⁹ Lokalitet je istraživao od 25. rujna 2006. do 31. listopada 2006. godine, a nalazi se na trasi autoceste A5, na dionici Đakovo-Sredanci.¹⁰

Ivandvor-Šuma Gaj jedino je od analiziranih nalazišta na kojima je utvrđen sopotski sloj. Istraživanja su provedena od 27. srpnja do 5. kolovoza 2006. godine. Nalazište je smješteno na povišenom položaju, koji je sa sjeverne i južne strane omeđen niskim vodoplovnim područjem. Sopotsko naselje je serijom od četiri radiokarbonska datuma datirano u vrijeme između 5010. i 4500. god. pr. Kr.¹¹

⁵ Težak-Gregl 1998, 59.

⁶ Karavanić, Balen 2003, 48.

⁷ Zeder, Smith 2009, 687.

⁸ Valamoti, Kostakis 2007, 83.

⁹ Balen 2009a, 61.

¹⁰ Balen 2007, 27.

¹¹ Balen 2008b, 16; Balen 2007a, 15.

agriculture and cattle-breeding,⁵ thereby ensuring a constant source of food.⁶ However, it should be noted that such changes in the economy and sustenance strategies cannot be explained by a single universally-applicable theory.⁷ In connection with this, the original acceptance of cultivated plant species could not have been a unidirectional process in which cultivated plants spread around the world exclusively for their properties,⁸ but must have been a process which included other aspects of society, in the sense of social and economic organization reflected through a change in settlement organization and structure.

This period at the sites under study will be observed through two cultures – the Starčevo and Sopot cultures. The Starčevo culture is present at Pajtenica-Velike Livade, and the Sopot culture at Ivandvor-Šuma Gaj.

Two excavated settlements of the Starčevo culture at Tomašanci-Palača can be dated to its late phase, with radiocarbon dates spanning from 5660 to 5300 BC. At Pajtenica-Velike Livade, the radiocarbon dates obtained for the Starčevo culture fall within the same time span.⁹ The site was excavated between September 25, 2006 and October 31, 2006, and is located on the A5 motorway, between Đakovo and Sredanci.¹⁰

Ivandvor-Šuma Gaj is the only one of the analysed sites where a layer of the Sopot culture was established. Excavations were carried out between July 27, 2006 and August 5, 2006. The site is located on a raised position with lower areas, frequently flooded, to the north and south. The settlement of the Sopot culture yielded four radiocarbon dates ranging between 5010 and 4500 BC.¹¹

⁵ Težak-Gregl 1998, 59.

⁶ Karavanić, Balen 2003, 48.

⁷ Zeder, Smith 2009, 687.

⁸ Valamoti, Kostakis 2007, 83.

⁹ Balen 2009a, 61.

¹⁰ Balen 2007, 27.

¹¹ Balen 2008b, 16; Balen 2007a, 15.

Eneolitik

Eneolitik, ili bakreno doba, razdoblje je koje slijedi nakon neolitika i tijekom kojeg je klima, nekoć pogodna za zemljoradnju, postala hladnija, pa se fokus privrede premjestio na stočarstvo.¹² Javljaju se određene razlike u tipovima naselja, ali one nisu nužno rezultat prijelaza sa zemljoradnje na stočarstvo,¹³ kao što je predlagano u tradicionalnim studijama o bakrenom dobu u regiji.¹⁴

Na temelju podataka iz dosadašnjih istraživanja na području istočne Hrvatske, razlikujemo nekoliko kultura, odnosno kulturnih skupina šire teritorijalne rasprostranjenosti, koje su se u vremenskom rasponu od cca 4500. do 2450. pr. Kr. izmjenjivale ili usporedo razvijale.¹⁵ U sklopu ovoga rada bit će riječi o dvije kulturne pojave – lasinjskoj i kostolačkoj kulturi. Lasinjska kultura ustanovljena je na lokalitetima Pajtenica-Velike Livade i Jurjevac-Stara Vodenica, a kostolačka kultura na lokalitetu Đakovo-Franjevac.

Na temelju zaštitnih arheoloških istraživanja na nalazištu Pajtenica-Velike Livade može se govoriti o postojanju manjega pretpovijesnog naselja te o manjem naselju iz srednjovjekovnog razdoblja. Lasinjska kultura na ovome lokalitetu datirana je u vrijeme između 4300. i 3900. pr. Kr.¹⁶ Na temelju zaštitnih arheoloških istraživanja, koja je u razdoblju od 25. ožujka do 15. svibnja 2008. godine proveo Arheološki muzej u Zagrebu na nalazištu Jurjevac-Stara Vodenica, može se govoriti o postojanju dvaju manjih pretpovijesnih naselja, kao i o manjem naselju iz srednjovjekovnog razdoblja. Materijal ima

The Copper Age

The Copper Age is a period of prehistory, occurring after the Neolithic, when the climate, once suitable for agriculture, became colder, shifting the focus of the economy to cattle-breeding.¹² Certain differences appear in the types of settlements, but they are not necessarily a result of the transition from agriculture to cattle breeding,¹³ as suggested in traditional studies of the Copper Age in the region.¹⁴

Based on available research done in eastern Croatia, we can distinguish among several cultural groups covering a wide geographical area, roughly dated between 4500 and 2450 BC.¹⁵ In this paper, two cultures will be discussed – the Lasinja and Kostolac cultures. The Lasinja culture was established at Pajtenica-Velike Livade and Jurjevac-Stara Vodenica, and the Kostolac culture at Đakovo-Franjevac.

Based on rescue excavations conducted at Pajtenica-Velike Livade, a smaller prehistoric settlement and a larger one dated to the Middle Ages were defined. The Lasinja settlement at this site was dated to the period between 4300 and 3900 BC.¹⁶ Based on the rescue excavations at Jurjevac-Stara Vodenica between March 25 and May 15, 2008, conducted by the Archaeological Museum in Zagreb, the prehistoric material has been ascribed to the Lasinja culture, and radiocarbon dates fall in the range between 4320 and 3960 BC.¹⁷

The site of Đakovo-Franjevac was excavated by the Archaeological Museum in Zagreb between February 26 and July 26, 2007 (with a two-month break). The preliminary typological pottery analysis and obtained radiocarbon

¹² Virág 2004, 7.

¹³ Parkinson, Yerkes, Gyucha 2004, 109.

¹⁴ Dimitrijević 1979, 146; Homen 1990, 54; Marković 1994, 39; Balen 1998, 14.

¹⁵ Balen 2010, 171.

¹⁶ Balen 2007, 27.

¹² Virág 2004, 7.

¹³ Parkinson, Yerkes, Gyucha 2004, 109.

¹⁴ Dimitrijević 1979, 146; Homen 1990, 54; Marković 1994, 39; Balen 1997, 14.

¹⁵ Balen 2010, 171.

¹⁶ Balen 2007, 27.

¹⁷ Balen 2009, 56-58.

karakteristike lasinjske kulture, a dobiveni apsolutni datumi kreću se u rasponu od 4320. do 3960. pr. Kr.¹⁷

Arheološki muzej u Zagrebu proveo je zaštitna istraživanja na lokalitetu Đakovo-Franjevac u razdoblju između 26. veljače i 26. lipnja 2007. godine (uz dvomjesečni prekid). Preliminarna tipološka analiza keramike i dobiveni 14 C datumi pokazuju da je na položaju Franjevac od 3340. do 2840. pr. Kr. postojalo jedno dugotrajnije naselje pripadnika kostolačke kulture.¹⁸

Analize biljnih ostataka

Arheobotanika je grana arheologije koja se bavi proučavanjem korištenja biljaka kod prošlih populacija, odnosno, identificiranjem biljnih ostataka u arheološkim kontekstima s ciljem rekonstruiranja prošlih krajolika, prehrane i ekonomije. Pri proučavanju dokaza o prehrambenim navikama i korištenju biljaka, moramo uzeti u obzir izravne i neizravne dokaze. Izravni dokazi su biljni ostaci (sjemenke, voće, ugljen) koji su pronađeni u različitim strukturama te koprolit (fosilizirani ljudski izmet), dok neizravni uključuju tragove koji su ostali u obrađivanim poljima, a koji bi nam mogli pomoći u određivanju toga je li neko područje korišteno za zemljoradnju ili nije, kao i različite pojave unutar naselja, gdje su se vjerojatno odvijale aktivnosti vezane uz žetvu (uključujući alate korištene za pripremu i obradu biljaka).¹⁹ Na ovim lokalitetima nije bilo moguće ustanoviti tragove zemljoradničkih aktivnosti na poljima, ali nalazi žrvnjeva i ostaloga lomljenoga kamenog oruđa iz raznih jamskih objekata unutar naselja ukazuju na činjenicu da su ondje biljke obrađivane nakon žetve.

¹⁷ Balen 2009, 56-58.

¹⁸ Balen 2008, 9-11.

¹⁹ Mihelić 2002, 254.

dates show that a long-term settlement of the Kostolac culture existed at Đakovo-Franjevac between 3340 and 2840 BC.¹⁸

Analyses of plant remains

Archaeobotany is a field of archaeology which examines the use of plants in past populations, that is, it identifies plant remains in archaeological contexts with the aim of reconstructing past landscapes, diets and economies. When dealing with evidence of dietary habits and the use of plants, we must consider direct and indirect evidence. Direct evidence includes plant remains (seeds, fruit, charcoal) found in various structures and coprolite (fossilized human faeces), while indirect evidence includes traces left in cultivated fields which can help determine whether the area was used for agricultural purposes, as well as various features found in settlements where harvest-related activities were most likely carried out (including tools used for plant processing and preparation).¹⁹ At these sites, it was impossible to establish traces of agricultural activities in the fields, but finds of grindstones and other chipped stone tools in various pit-like objects situated inside the settlements point to the fact that plants were processed there after harvesting. Plant remains which came in contact with fire and can withstand the process of carbonization are found in archaeological contexts at all four sites. They are considered to be 'eco-facts', that is, a result of human activity,²⁰ which means they can provide us with an insight into the everyday life of the population under study. Plant remains can tell us which plants were used and when they were harvested and, possibly, stored (seeds and fruits are planted and ripen at certain seasons). The numerical frequency of plant remains can be misleading because the most numerous remains could

¹⁸ Balen 2008, 9-11.

¹⁹ Mihelić 2002, 254.

²⁰ Jeraj, Velušček, Jacomet 2004, 78.

Na sva su četiri lokaliteta u arheološkim kontekstima pronađeni biljni ostaci koji su bili izloženi vatri i koji mogu podnijeti proces karbonizacije. Biljni ostaci s arheoloških lokaliteta su »ekofakti«, odnosno posljedica ljudskog djelovanja,²⁰ što znači da nam mogu dati uvid u svakodnevni život proučavane populacije. Biljni nam ostaci mogu reći koje su biljke korištene i kada se odvijala žetva te kada su biljke pohranjivane (sjemenke i voće sadi se i bere u određeno vrijeme). Numerička frekvencija nalaza može zavarati jer su najbrojniji ostaci mogli ostati sačuvani slučajno (npr. zbog pogreške u pripremanju ili skladištenju), zbog razlike u veličini ili udjelima u ljudskoj prehrani (npr. zrno ječma ne može se usporediti sa žirom),²¹ ili pak zbog metoda uzimanja uzoraka na određenom lokalitetu.

Arheobotaničke analize biljnih ostataka s prethodno spomenutih lokaliteta provela je Kelly Reed sa Sveučilišta u Leicesteru.²² Od analiziranih uzoraka, 275 je s lokaliteta Đakovo-Franjevac, 22 s lokaliteta Ivandvor-Šuma Gaj, 50 s lokaliteta Jurjevac-Stara Vodenica, i 25 s lokaliteta Pajtenica-Velike Livade.²³ Riječ je o relativno malom broju uzoraka s obzirom na broj lokaliteta pa nije bilo moguće utvrditi minimalne kriterije za uključivanje rezultata u daljnje analize i interpretacije. Uzorci su podijeljeni u sedam kategorija, koje su zatim podijeljene u podskupine na temelju biljnih vrsta, a bilo ih je moguće prepoznati zbog dobre očuvanosti sjemenki i/ili plodova.²⁴ Kategorije su određene prema biljnim ostacima pronađenim na spomenutim lokalitetima i, osim žitarica koje se od samog početka

have been preserved accidentally (e.g. due to errors in processing or storing), due to the difference in size or ratios in the human diet (e.g. a barley seed cannot be compared to an acorn),²¹ or due to the sampling methods applied at a given site.

The archaeobotanical analyses of plant remains from the aforementioned sites were carried out by Kelly Reed of the University of Leicester.²² Of the samples analysed, 275 are from Đakovo-Franjevac, 22 from Ivandvor-Šuma Gaj, 50 from Jurjevac-Stara Vodenica, and 25 from Pajtenica-Velike Livade.²³ The number of samples is relatively small considering the number of sites, so it was impossible to determine the minimal criteria for including the results in further analysis and interpretation. The samples were divided into seven categories, which were then divided into subgroups based on plant species which were recognizable due to the well-preserved state of seeds and/or fruits.²⁴ The categories are defined based on the plant species that were recovered from the sites mentioned, and, besides cereals, which have been widely researched in archaeobotany since the time of pioneer research,²⁵ bran, pulses, fruit, oil plants, and weeds were also analysed. The results will be compared to other, more recent, archaeobotanical studies done in the region,²⁶ paying attention to species defined by Zohary as the eight 'founder crops': einkorn, emmer, barley, pea, lentil, chickpea, bitter vetch and flax,²⁷ as well as to wild weed species found alongside grain, and seeing if and how their number increases over time. The results of plant analyses, as well as finds of other archaeological material from the sites, will serve as a basis for an attempt at recon-

²⁰ Jeraj, Velušček, Jacomet 2004, 78.

²¹ Renfrew, Bahn 2006, 276.

²² Balen 2011; Balen 2008b, 6; Reed 2012, vol. 1 i 2.

²³ Reed 2012, 266, Fig 4.2.2.; 267, Fig. 4.3.2.; 267, Fig. 4.3.4.; 267, Fig. 4.3.1.

²⁴ Reed 2012.

²¹ Renfrew, Bahn 2006, 276.

²² Balen 2011; Balen 2008b, 6; Reed 2012, vol. 1 and 2.

²³ Reed 2012, 266, Fig 4.2.2.; 267, Fig. 4.3.2.; 267, Fig. 4.3.4.; 267, Fig. 4.3.1.

²⁴ Reed 2012.

²⁵ Colledge, Conolly 2007a, xii.

²⁶ Reed 2012; Reed 2014; Reed 2014a.

²⁷ Zohary 1996.

temeljito istražuju u arheobotanici,²⁵ pronađeni su ostaci mekinja, mahunarki, voća, uljarica i trava. Rezultati su uspoređeni s drugim, novijim, arheobotaničkim studijama, provedenim u regiji,²⁶ obrativši pažnju na ono što je Zohary definirao kao osam začetničkih usjeva: jednozrna pšenica, dvozrna pšenica, ječam, grašak, leća, slanutak, bob i lan,²⁷ kao i na vrste divljih trava koje rastu uz usjeve, s ciljem utvrđivanja je li se i kako njihov broj povećavao kroz vrijeme. Rezultati analiza biljaka, kao i ostali arheološki materijal s lokaliteta, bit će temelj za pokušaj rekonstruiranja metoda korištenja biljaka od ranog neolitika do kasnog eneolitika Đakovštine, odnosno za utvrđivanje je li u određenom razdoblju korištena intenzivna ili ekstenzivna kultivacija. Intenzivna kultivacija zahtijeva mnogo rada na zadanom području, što omogućava restriktivnu kultivaciju, a ekstenzivna kultivacija iziskuje veće površine zemlje s manje intenzivnom kultivacijom. Kada je riječ o kultivaciji, dolazi do nekoliko problema: mobilnost zemljoradnika, važnost uzgajanih biljaka u prehrani proučavane populacije i zahtijevnost posla.²⁸

Rezultati

Uzorci datirani u neolitik potječu s lokaliteta Pajtenica-Velike Livade (3 uzorka,²⁹ starčevačka kultura) i Ivandvor-Šuma Gaj (14 uzoraka,³⁰ sopotka kultura).

Kao što je vidljivo iz tablice 1 svi uzorci s lokaliteta Pajtenica-Velike Livade,³¹ pripisani starčevačkoj kulturi, stavljeni su u kategoriju »neodredivo«.

²⁵ Colledge, Conolly 2007a, xii.

²⁶ Reed 2012; Reed 2014; Reed 2014a.

²⁷ Zohary 1996.

²⁸ Bogaard 2005, 177, 179.

²⁹ Reed 2014a, 25, T. 1.

³⁰ Reed 2012, vol. 1., 248; vol. 2., 344.

³¹ Reed 2014a, 25, T. 1.

structuring plant cultivation methods from the early Neolithic to the late Copper Age in the Đakovo region with the aim of determining whether intensive or extensive cultivation was practised in specific periods. Intensive cultivation requires a large amount of labour per given area, hence allowing for restrictive cultivation, whereas extensive cultivation requires larger areas of land with less frequent cultivation. When dealing with cultivation, several issues arise: the mobility of the cultivators, the importance of the cultivated plants in the diet of the population under study, and the labour-intensity of the work.²⁸

Results

Samples dated to the Neolithic were taken at Pajtenica-Velike Livade (3 samples,²⁹ Starčevo culture) and Ivandvor-Šuma Gaj (14 samples,³⁰ Sopot culture).

As Table 1 shows, all samples from Pajtenica-Velike Livade³¹ ascribed to the Starčevo culture were placed in the 'undeterminable' category.

²⁸ Bogaard 2005, 177, 179.

²⁹ Reed 2014a, 25, T. 1.

³⁰ Reed 2012, vol. 1, 248; vol. 2, 344.

³¹ Reed 2014a, 25, T. 1.

Vrsta ostatka / Type of find	Postotak / Percentage
NEODREDIVO / INDETERMINATE	100%

Tablica / Table 1: Uzorci starčevačke kulture s lokaliteta Pajtenica-Velike Livade / Samples of the Starčevo culture from Pajtenica-Velike Livade

Vrsta ostatka / Type of find	Postotak / Percentage
ŽITARICE / GRAIN	77%
<i>Triticum dicoccum</i>	14%
<i>Triticum monococcum</i>	14%
<i>Triticum</i> spp.	21%
Neodrediva žitarica / Undeterminable grain	29%
MEKINJE / BRAN	9%
<i>Triticum monococcum / dicoccum</i>	7%
MAHUNARKE / PULSES	14%
<i>Lens culinaris</i>	14%
Neodrediva mahunarke / Undeterminable pulses	7%
NEODREDIVO / INDETERMINATE	43%

Tablica / Table 2: Uzorci sopotske kulture s lokaliteta Ivandvor-Šuma Gaj / Samples of the Sopot culture from Ivandvor-Šuma Gaj

Kao što je vidljivo iz tablice 2 većina analiziranih uzoraka s lokaliteta Ivandvor-Šuma Gaj³² stavljena je u kategoriju »neodređeno« (43%). Ostali uzorci svrstani su u sljedeće kategorije: žitarice (77%), mahunarke (14%), i mekinje (9%). Najbrojniji ostaci su u kategoriji žitarica: dvozna pšenica (14%), jednozna pšenica (14%), usporedivo s vrstom pšenice (21%) i neodrediva žitarica (29%). Osim pšenice, pronađeni su i brojni ostaci neodredive žitarice. Sljedeća kategorija prema brojniosti su mahunarke, odnosno leća (14%) i neodredive mahunarke (7%). Najmanje brojna kategorija je ona s mekinjama – jednozna pšenica/dvozna pšenica.

³² Reed 2012, vol. 2., 339, t. 4.19.

As Table 2 shows, of the samples from Ivandvor-Šuma Gaj³² which were sent for analysis, most fall into the 'Indeterminate category' (43%). The rest of the plant remains are divided into categories as follows: grain (77%), pulses (14%), and bran (9%). The most numerous remains fall into the category of grain: emmer (14%), einkorn (14%), comparable to species of wheat (21%), and undeterminable cereal (29%). Along with wheat, numerous remains of undeterminable cereals were found. The following group includes the remains of pulses, that is, lentil (14%) and undeterminable pulses (7%). The least numerous remains are in the category of bran – einkorn/emmer.

³² Reed 2012, vol. 2, 339, T. 4.19.

Vrsta ostatka / Type of find	Postotak / Percentage
ŽITARICE / GRAIN	88%
<i>Hordeum vulgare</i> var. <i>nudum</i>	9%
<i>Triticum monococcum</i> / <i>dicoccum</i>	4%
<i>Triticum</i> spp.	4%
Neodredive žitarice / Undeterminable grain	48%
TRAVE / WEEDS	12%
<i>Galium</i> sp.	4%
Velike trave / <i>Graminae</i> large	9%
NEODREDIVO / INDETERMINATE	57%

Tablica / Table 3: Uzorci lasinjske kulture s lokaliteta Pajtenica-Velike Livade / Samples of the Lasinja culture from Pajtenica-Velike Livade

Uzorci datirani u eneolitik uzeti su s lokaliteta Pajtenica-Velike Livade (23 uzorka,³³ lasinjska kultura), Jurjevac-Stara Vodenica (12 uzoraka,³⁴ lasinjska kultura) i Đakovo-Franjevac (29 uzoraka,³⁵ kostolačka kultura).

Kao što je vidljivo iz tablice 3, većina analiziranih uzoraka s lokaliteta Pajtenica-Velike Livade³⁶ stavljena je u kategoriju »neodredivo« (57%). Ostali uzorci svrstani su u sljedeće kategorije: žitarice (88%) i trave (12%). Većina ostataka žitarica (48%) bila je neodrediva, a ostatak uključuje nalaze ječma, jednozrne/dvozrne pšenice i ostatke usporedive s pšenicom. U kategoriji trava nalaze se velike trave i ostaci usporedivi s broćikom.

Kao što je vidljivo iz tablice 4, većina analiziranih uzoraka s lokaliteta Jurjevac-Stara Vodenica³⁷ stavljena je u kategoriju »neodredivo« (67%). Ostali uzorci svrstani su u sljedeće kategorije: žitarice

Samples dated to the Copper Age were taken at Pajtenica-Velike Livade (23 samples,³³ the Lasinja culture), Jurjevac-Stara Vodenica (12 samples,³⁴ the Lasinja culture), and Đakovo-Franjevac (29 samples,³⁵ the Kostolac culture).

As Table 3³⁶ shows, of the samples from Pajtenica-Velike Livade which were sent for analysis, most fall into the 'Indeterminate category' (57%). The rest of the plant remains are divided into categories as follows: grain (88%) and weeds (12%). Most grain remains (48%) were indeterminate, while barley, einkorn/emmer, and remains comparable to species of wheat comprise the rest of the finds. In the category of weeds, large grasses were found along with remains comparable to lady's bedstraw.

As Table 4 shows, of the samples from Jurjevac-Stara Vodenica³⁷ which were sent for analysis, most fall into the 'Indeterminate category' (67%). The rest of the plant remains

³³ Reed 2012, vol. 1., 151; vol. 2., 344.

³⁴ Reed 2012, vol. 1., 251; vol. 2., 344.

³⁵ Reed 2012, vol. 1., 250; vol. 2., 344.

³⁶ Reed 2012, vol. 2., 341-342, t. 4.20.

³⁷ Reed 2012, vol. 2., 341-342, t. 4.20.

³³ Reed 2012, vol. 1, 151; vol. 2, 344.

³⁴ Reed 2012, vol. 1, 251; vol. 2, 344.

³⁵ Reed 2012, vol. 1, 250; vol. 2, 344.

³⁶ Reed 2012, vol. 2, 341-342, T. 4.20.

³⁷ Reed 2012, vol. 2., 341-342, T. 4.20.

Vrsta ostatka / Type of find	Postotak / Percentage
ŽITARICE / GRAIN	68%
<i>Triticum dicoccum</i>	25%
Neodredive žitarice / Undeterminable grain	58%
MEKINJE / BRAN	12%
<i>Triticum dicoccum</i> g/b	8%
<i>Triticum spelta</i> g/b	8%
<i>Triticum</i> sp. g/b	17%
<i>Triticum aestivum/durum</i>	0%
VOĆE / FRUIT	20%
<i>Cornus mas</i>	8%
<i>Prunus</i> cf. <i>spinosa</i>	8%
NEODREDIVO / INDETERMINATE	67%

Tablica / Table 4: Uzorci lasinjske kulture s lokaliteta Jurjevac-Stara Vodenica / Samples of the Lasinja culture from Jurjevac-Stara Vodenica

(68%), voće (20%), mekinje (12%). Kategorija žitarica uključuje dvozrnu pšenicu (25%) i neodredive žitarice (58%). Kategorija voća uključuje drijen (8%) i šljivu (8%).

Kao što je vidljivo iz tablice 5, većina analiziranih uzoraka s lokaliteta Đakovo-Franjevac³⁸ stavljena je u kategoriju »neodredivo« (90%). Ostali uzorci svrstani su u sljedeće kategorije: žitarice (60%), trave (19%), mahunarke (7%), voće (7%), mekinje (6%) i uljarice (1%). Većina ostataka žitarica bila je neodrediva (90%), a ostali uključuju ječam (10%), dvozrnu pšenicu (10%), jednozrnu pšenicu (41%), jednozrnu/dvozrnu pšenicu (17%), običnu pšenicu (3%), ostatke usporedive s vrstom pšenice (24%) i proso (3%). Ostaci trave uključuju kukolj (3%), ostatke usporedive s ovsikom (21%), ostatke usporedive s grabom (3%), pepeljugu (7%), ostatke usporedive s broćikom (7%), velike trave

are divided into categories as follows: grain (68%), fruit (20%), bran (12%). The category of grain remains includes emmer (25%) and undeterminable grain (58%). The category of fruit includes cornelian cherry (8%) and plum (8%).

As Table 5 shows, of the samples from Đakovo-Franjevac³⁸ which were sent for analysis, most fall into the 'Indeterminate category' (90%). The rest of the plant remains are divided into categories as follows: grain (60%), weeds (19%), pulses (7%), fruit (7%), bran (6%) and oil plants (1%). Most grain remains were undeterminable (90%), and the rest include barley (10%), emmer (10%), einkorn (41%), einkorn/emmer (17%), bread wheat (3%), remains comparable to species of wheat (24%), and millet (3%). Weed remains include corncockle (3%), remains comparable to bromus (21%), remains comparable to hornbeam (3%), white goosefoot (7%), remains comparable to lady's bedstraw (7%),

³⁸ Reed 2012, vol. 2., 341-342, t. 4.20.

³⁸ Reed 2012, vol. 2., 341-342, T. 4.20.

Vrsta ostatka / Type of find	Postotak / Percentage
ŽITARICE / GRAIN	60%
<i>Hordeum vulgare</i> var. <i>nudum</i>	10%
<i>Triticum dicoccum</i>	10%
<i>Triticum monococcum</i>	41%
<i>Triticum monococcum/dicoccum</i>	17%
<i>Triticum aestivum/durum</i>	3%
<i>Triticum</i> spp.	24%
Neodredive žitarice / Undeterminable grain	90%
<i>Panicum miliaceum</i>	3%
MEKINJE / BRAN	6%
<i>Triticum monococcum</i> g/b	7%
<i>Triticum monococcum / dicoccum</i> g/b	7%
<i>Triticum</i> sp. g/b	3%
MAHUNARKE / PULSES	7%
<i>Lathyrus sativum</i>	3%
<i>Lens culinai</i>	3%
<i>Pisum sativum</i>	17%
Neodredive mahunarke / Undeterminable pulses	10%
ULJARICE / OIL PLANTS	1%
<i>Linum usitatissimum</i>	10%
VOĆE / FRUIT	7%
<i>Cornus mas</i>	14%
<i>Physalis alkekengi</i>	21%
<i>Rubus fruticosus</i>	7%
<i>Rubus</i> sp.	3%
<i>Sambucus ebulus</i>	7%
Neodredivo voće / Undeterminable fruit	3%
TRAVE / WEEDS	19%
<i>Agrostemma githago</i>	3%
<i>Bromus</i> sp.	21%
cf. <i>Carpinus betulus</i>	3%

<i>Chenopodium album</i>	7%
<i>Galium</i> sp.	7%
Velike trave / <i>Graminae</i> large	14%
Male trave / <i>Graminae</i> small	3%
<i>Lolium</i> sp.	3%
<i>Phleum</i> sp.	3%
<i>Polygonum</i> sp.	14%
<i>Rumex</i> / <i>Polygonum</i> sp.	10%
<i>Setaria viridis</i>	7%
Mahunarke sitnog sjemena / Small seeded legumes	7%
<i>Solanaceae</i>	3%
<i>Teucrium</i> sp.	3%
NEODREDIVO / INDETERMINATE	90%

Tablica / Table 5: Uzorci kostolačke kulture s lokaliteta Đakovo-Franjevac / Samples of the Kostolac culture from Đakovo-Franjevac

(14%), male trave (3%), ostatke usporedive s ljuljem (3%), ostatke usporedive s mačićom (3%), ostatke usporedive s vrstom oštrika (14%), ostatke usporedive s oštrikom (10%), zeleni muhar (7%), mahunarke sitnog sjemena (7%), pomoćnice (3%) i ostatke usporedive s dubčcem (3%). Ostaci mahunarki uključuju grahor (3%), leću (3%), grašak (17%) i neodredive mahunarke (10%). Ostaci voća uključuju drijen (14%), ljuskavac (21%), malinu (7%), ostatke usporedive s vrstom maline (3%), bazgu (7%) i neodredivo voće (3%). Ostaci mekinja uključuju jednozrnu pšenicu (7%), jednozrnu/dvozrnu pšenicu (7%) i ostatke usporedive s vrstom pšenice (3%). Uljarice su predstavljene nalazom lana (10%).

U tablici 6 prikazano je prisutstvo/odsutstvo određenih biljnih ostataka s obzirom na kulturnu pripadnost i razdoblje.

large grasses (14%), small grasses (3%), remains comparable to ryegrass (3%), remains comparable to catstail (3%), remains comparable to species of birdgrass (14%), remains comparable to birdgrass (10%), green foxtail (7%), small seeded legumes (7%), nightshades (3%) and remains comparable to teucrium (3%). Remains of pulses include grass pea (3%), lentil (3%), pea (17%) and undeterminable legumes (10%). Fruit remains include cornelian cherry (14%), Chinese lantern (21%), raspberry (7%), remains comparable to species of raspberry (3%), danewort (7%) and undeterminable fruit remains (3%). Bran remains include einkorn (7%), einkorn/emmer (7%) and remains comparable to species of wheat (3%). Oil Plants are represented by a find of flax (10%).

Table 6 shows the absence/presence of specific plant remains distributed by culture and period.

Vrsta ostatka / Type of find	Neolitik / Neolithic		Eneolitik / Copper Age	
	Starčevačka kultura / The Starčevo Culture	Sopotska kultura / The Sopot Culture	Lasinjska kultura / The Lasinja Culture	Kostolačka kultura / The Kostolac Culture
ŽITARICE / GRAIN				
<i>Hordeum vulgare</i> var. <i>nudum</i>	-	+	+	+
<i>Triticum dicoccum</i>	-	-	+	+
<i>Triticum</i> cf. <i>dicoccum</i>	-	-	-	+
<i>Triticum monococcum</i> / <i>dicoccum</i>	-	+	+	+
<i>Triticum</i> cf. <i>aestivum</i> / <i>durum</i>	-	-	-	+
<i>Triticum</i> spp.	-	+	+	+
<i>Panicum miliaceum</i>	-	-	-	+
Neodrediva žitarica / Undeterminable grain	-	+	+	+
MEKINJE / BRAN				
<i>Triticum monococcum</i> / <i>dicoccum</i> g/b	-	+	-	+
<i>Triticum monococcum</i> g/b	-	-	-	+
<i>Triticum dicoccum</i> g/b	-	-	+	-
<i>Triticum spelta</i> g/b	-	-	+	-
<i>Triticum</i> sp. g/b	-	-	+	+
<i>Triticum aestivum</i> / <i>durum</i>	-	-	+	-
MAHUNARKE / PULSES				
<i>Lens culinaris</i>	-	+	-	+
<i>Pisum sativum</i>	-	-	-	+
<i>Lathyrus sativum</i>	-	-	-	+
Neodrediva mahunarke / Undeterminable pulses	-	+	-	-
VOĆE / FRUIT				
<i>Cornus mas</i>	-	-	+	+
<i>Physalis alkekengi</i>	-	-	-	+
<i>Prunus</i> cf. <i>spinosa</i>	-	-	+	-
<i>Rubus</i> sp.	-	-	-	+
<i>Rubus fruticosus</i>	-	-	-	+
Neodredivo voće / Undeterminable fruit	-	-	-	+

Vrsta ostatka / Type of find	Neolitik / Neolithic		Eneolitik / Copper Age	
	Starčevačka kultura / The Starčevo Culture	Sopotska kultura / The Sopot Culture	Lasinjska kultura / The Lasinja Culture	Kostolačka kultura / The Kostolac Culture
<i>Sambucus ebulus</i>	-	-	-	+
TRAVE / WEEDS				
<i>Agrostemma githago</i>	-	-	-	+
<i>Bromus</i> sp.	-	-	-	+
cf. <i>Carpinus betulus</i>	-	-	-	+
<i>Chenopodium album</i>	-	-	-	+
<i>Setaria viridis</i>	-	-	-	+
<i>Galium</i> sp.	-	-	+	+
Velike trave / <i>Gramineae</i> large	-	-	+	+
<i>Lolium</i> sp.	-	-	-	+
Male trave / <i>Graminae</i> small	-	-	-	+
<i>Phleum</i> sp.	-	-	-	+
<i>Polygonum</i> sp.	-	-	-	+
<i>Rumex</i> / <i>Polygonum</i> sp.	-	-	-	+
<i>Teucrium</i> sp.	-	-	-	+
<i>Solanaceae</i>	-	-	-	+
Mahunarke sitnog sjemena / Small seed pulses	-	-	-	+
ULJARICE / OIL PLANTS				
<i>Linum usitatissimum</i>	-	-	-	+
NEODREDIVO / INDETERMINATE	+	+	+	+

Tablica / Table 6: Odredene biljne vrste s obzirom na arheološko razdoblje i kulturu / Plant species determined in relation to archaeological period and culture

Rasprava

Sve identificirane biljne vrste u kategoriji žitarica (ječam, jednozrna pšenica, dvozrna pšenica, obična pšenica, proso i ostaci usporedivi s ovim vrstama) te vrste koje su definirane na temelju nalaza mekinja, odnosno ovojnica sjemena koje su odvo-

Discussion

All plant species identified in the category of grain (barley, einkorn, emmer, bread wheat, millet and remains comparable to these species) and species which were recognized through bran, that is seed casings separated naturally or by intentional crushing (einkorn,

jene prirodnim ili namjernim drobljenjem (jednozrna pšenica, dvozna pšenica, ječam i ostaci sličnih usporedivih biljaka) su jestive. Sve ustanovljene vrste žitarica u regiju su stigle kao dio začetničkog paketa te su poznate na tom području od ranog neolitika.³⁹

Ostaci mahunarki uključuju grahor, leću, grašak i slične vrste. Sve su vrste jestive, a grašak i leća u široj su regiji poznati od ranog neolitika.⁴⁰

Pronđeni su ostaci sljedećih vrsta voća: drijen, ljuskavac, malina, šljiva i ostaci usporedivi s drugim vrstama. Sve su vrste jestive, ali neke su mogle služiti i u druge svrhe. Primjerice, drijen se mogao koristiti u prehrani, ali i kao materijal za izradu držaka za razna oruđa i oružja, kao što je to bio slučaj s glačanom kamenom sjekrom s lokaliteta Stare Gmajne u Sloveniji, koja je pronađena s drškom od drijena očuvanom zbog iznimno vlažnih uvjeta.⁴¹ Kao što je vidljivo iz tablice 6, ostaci voća ne pojavljuju se na analiziranim lokalitetima do vremena lasinjske kulture, odnosno ranog eneolitika. Ipak, voće, točnije ostaci sjemenki ljuskavca pronađeni su u kasnoneolitičkom sloju na lokalitetu Sopot, što znači da je to voće korišteno u široj regiji od ranijih vremena.⁴²

Kategorija trava uglavnom uključuje uzorke kojima se mogao odrediti rod, ali ne i vrsta. Neke od identificiranih vrsta nisu jestive za ljude (ljulj i pomoćnice), ali su mogle služiti kao hrana za stoku. Pojavljuju se uglavnom biljke koje rastu uz kultivirane žitarice, prije svega pšenicu. Trave pronađene u kontekstu sa žitaricama pružaju informacije o aktivnostima poput sjetve, žetve i obrade, čime doprinose razumijevanju društvenih aktivnosti

emmer, barley and remains of similar comparable species) are edible. All established grain species arrived in the region as part of the 'founding package', and had been known in the region since the early-Neolithic Starčevo culture.³⁹

The remains of pulses include grass pea, lentil, pea and similar species. All species are edible, and pea and lentil have been known in the wider region since the early Neolithic.⁴⁰

The remains of the following fruit were found: cornelian cherry, Chinese lantern, raspberry, plum, and species comparable to other fruit. All species are edible, but some could have been used for other purposes. Notably, cornelian cherry could have been used not only as food, but also as material used for hafting different tools or weapons, for example the polished stone axe found at Stare Gmajne in Slovenia, which was preserved, along with a wooden haft, due to the extremely humid conditions.⁴¹ As Table 6 shows, fruit remains at the sites studied do not appear until the Lasinja culture, i.e. the early Copper Age period. However, fruit, in particular Chinese lantern seeds, was found in the late Neolithic layer at Sopot, indicating the usage of this fruit in the wider region from earlier times.⁴²

The category of weeds contains mostly samples of which the genus was determinable, but the species was not. Some of the identified genera and species are not edible for humans (sedges, ryegrass and nightshades), but could have been used to feed animals. Mostly plants which grow alongside cultivated cereals, especially wheat, appear. Weeds found in contexts with cereals provide information on activities such as time of planting, harvesting and processing, and they hence contribute to our understanding of the social activities of the first farmers.⁴³ *Chenopodium album*

³⁹ Reed 2014, 158, T. 1.

⁴⁰ Zohary 1996.

⁴¹ Tolar, Čufar, Velušček 2008, 49.

⁴² Reed 2014, 164.

⁴³ Jones 2002, 185; Colledge, Conolly 2007a, xii; Bogaard, Jones, Charles 2005, 505.

³⁹ Reed 2014, 158, T. 1.

⁴⁰ Zohary 1996.

⁴¹ Tolar, Čufar, Velušček 2008, 49.

⁴² Reed 2014, 164.

prvih zemljoradnika.⁴³ Biljka *Chenopodium album* (pepeljuga) je osobito važna u kontekstu ovdje analiziranih lokaliteta jer pripada rodu *Chenopodietea* koje se vežu uz proljetnu sjetvu uzgajanih žitarica, za razliku od roda *Secalinetea* koji se veže uz jesensku sjetvu. Sjeme biljaka iz roda *Chenopodietea* pogodno je za *in situ* sadnju manjih razmjera, kakva se provodi u vrtovima (uvjeti visoke produktivnosti).⁴⁴ Oštrik, mačica i bročika jestive su za ljude, ali su i odličan izvor lako dostupne hrane za stoku koja je morala biti dio neolitičke i eneolitičke ekonomije.

Uljarice, točnije, lan, pronađen je samo na kostolačkom lokalitetu Đakovo-Franjevac. Ipak, ova biljka pronađena je na nekim rano- i srednjeneolitičkom lokalitetima u regiji,⁴⁵ što znači da je na taj prostor stigla sa začetničkim paketom i da je korištena na tome prostoru.

Starčevačka kultura

Starčevačka kultura najstarija je neolitička pojava na prostoru Hrvatske. Ona se u svim segmentima ekonomske djelatnosti i tehnološki savršene keramičke produkcije predstavlja kao posve dovršena kulturna pojava neolitičkog vremena.⁴⁶ Nosioci ove kulture najčešće naseljavaju povišene terase uz obale rijeka ili potoka, ili ravna povišenja na vlažnijim područjima,⁴⁷ što je slučaj i na lokalitetu Pajtenica-Velike Livade. Dosadašnja istraživanja pokazala su da se naselja sastoje od niza jamskih objekata, a glavni je stambeni objekt zemuničkog tipa.⁴⁸ Ekonomija starčevačke kulture temelji se na poljoprivredi, stočarstvu i trgovini, čemu u prilog idu nalazi sjekira, srpova i žrvnjeva te raspored

(white goosefoot) is particularly important in the case of the sites analysed here because it belongs to the *Chenopodietea* class of arable weeds associated with spring-sown root/row crops, unlike the *Secalinetea* class, which is associated with autumn-sown crops. The *Chenopodietea* class seeds are adapted to *in situ* planting, which is associated with small-scale intensive cultivation in gardens (conditions of relatively high productivity).⁴⁴

Birdgrass, catstail and lady's bedstraw are edible for humans, but are also an excellent source of easily accessible food for cattle, which must have been part of the Neolithic and Copper Age economy.

Oil plants, namely flax, were recovered only from the Kostolac culture settlement at Đakovo-Franjevac. However, this plant was found at some early- and middle-Neolithic sites in the region,⁴⁵ indicating that it had arrived with the package of 'founding crops' and was being used in the area.

The Starčevo culture

The Starčevo culture is the earliest Neolithic culture in Croatia. In all segments of economic activities and technologically perfected pottery production, it appears as a completely developed Neolithic cultural occurrence.⁴⁶ The inhabitants usually settle raised terraces near rivers or streams, or flat raised areas in moist regions,⁴⁷ which is the case at Pajtenica-Velike Livade as well. Existing research has shown that settlements comprise a series of pits, and the main residential house is in fact a pit dwelling.⁴⁸ The economy of the Starčevo culture is based on agriculture, cattle-breeding and trade, as shown by finds of axes, sickles, grindstones and settlement layouts (usually several of them in a line around communication routes).⁴⁹ New radiocarbon

⁴³ Jones 2002, 185; Colledge, Conolly 2007a, xii; Bogaard, Jones, Charles 2005, 505.

⁴⁴ Bogaard, Jones, Charles 2005, 505-506.

⁴⁵ Reed 2014a, 4.

⁴⁶ Dimitrijević 1979a, 260.

⁴⁷ Kalicz, Virág, Biró 1998, 151-156.

⁴⁸ Dizdar, Krznarić Škrivanko 2000, 12.

⁴⁴ Bogaard, Jones, Charles 2005, 505-506.

⁴⁵ Reed 2014a, 4.

⁴⁶ Dimitrijević 1979a, 260.

⁴⁷ Kalicz, Virág, Biró 1998, 151-156.

⁴⁸ Dizdar, Krznarić Škrivanko 2000, 12.

⁴⁹ Reed 2014a, 25, T.1.

naselja (obično nekoliko njih u nizu oko putova za komunikaciju).⁴⁹

Novi radiokarbonski datumi za ranu starčevačku kulturu sugeriraju da je neolitik započeo već oko 6000. pr. Kr.⁵⁰ te da su ljudi, prije nego što su počeli uzgajati spomenute žitarice, prikupljali i koristili divlje plodove.⁵¹ Prehrana temeljena na žitaricama prouzročila je promjene u hranjivosti, što je pak dovelo do poboljšanja zdravstvenog i demografskog stanja populacije.⁵²

Biljni ostaci s lokaliteta Pajtenica-Velike Livade, pripisani starčevačkoj kulturi (tablica 1), ne pružaju mnogo informacija (prema nalazima nije bilo moguće utvrditi vrstu), a u usporedbi s geografski povezanim i istovremenim lokalitetom Tomašanci-Palača, tip naselja i korištenje biljaka uklapaju se u širu sliku starčevačke kulture, i to kroz nalaze žitarica, prvenstveno ječma i pšenice, kao i kroz ostatke voća.⁵³ Pronađeni su ostaci bazge i, iako je uzorak malen, otvara mogućnost da je i ta divlja vrsta bila dio prehrane starčevačke populacije.⁵⁴ Korištenje biljaka na oba lokaliteta dodatno dokazuju nalazi žrvnjeva i specifični tragovi na lomljenoj litici te sugeriraju da su stanovnici intenzivno rezali biljke. Velik broj nalaza lomljene litike na lokalitetu Tomašanci-Palača ima iskrzan rub, a i visok postotak oruđa upućuje na intenzivno korištenje ruktvorina. Na dva sječiva ustanovljen je sjaj srpa koji se pojavljuje zajedno sa specifičnim tragovima upotrebe, odnosno ogrebotinama, što je neposredan dokaz dvije vrste tragova na rubu što se javljaju kao posljedica korištenja sječiva pri rezanju bilja.⁵⁵

⁴⁹ Reed 2014a, 25, T.1.

⁵⁰ Minichreiter, Krajcar Bronić 2006, 5.

⁵¹ Miloglav 2011, 148.

⁵² Sheratt 2002, 14, 15, 62.

⁵³ Reed 2014, 158, T. 1.

⁵⁴ Đukić 2011, 25-27.

⁵⁵ Špoljar 2011, 47.

dates for the early Starčevo culture in continental Croatia suggest that the Neolithic had already started around 6000 BC,⁵⁰ and before the cultivation of the cereals mentioned, people gathered and used wild fruits.⁵¹ The cereal-based diet introduced changes to everyday nutrition, which, in turn, initiated an improvement in the population's health and demographic state.⁵²

Plant remains from Pajtenica-Velike Livade ascribed to the Starčevo culture (Table 1) do not provide much information (as it was impossible to determine the species of the finds obtained), but in comparison with the geographically related and contemporary site of Tomašanci-Palača, its settlement type and plant use fits into the well-known picture of the Starčevo culture through finds of cereals, primarily barley and wheat, as well as some fruit remains.⁵³ Remains of elderberry were found, and, although it was a small sample, this allows for the possibility that this wild species was a part of the diet of the Starčevo population.⁵⁴ The use of plants on both sites is additionally attested to by finds of grindstones and specific traces found on chipped stone tools which suggest extensive plant cutting. A large percentage of chipped stone tools from Tomašanci-Palača have chipped edges, and the high percentage of tools themselves suggests broad use. Two blades have a specific shine caused by cutting plants, which is direct proof that the blades were utilized as tools.⁵⁵

The Starčevo sites above yielded some of the eight 'founding crops' defined by Zohary in 1996, proving that these early sites had a sound basis for developing more sophisticated forms of agriculture. Nonetheless, there is no direct evidence of large-scale, or extensive, agricultural activities in the re-

⁵⁰ Minichreiter, Krajcar Bronić 2006, 5.

⁵¹ Miloglav 2011, 148.

⁵² Sheratt 2002, 14, 15, 62.

⁵³ Reed 2014, 158, T. 1.

⁵⁴ Đukić 2011, 25-27.

⁵⁵ Špoljar 2011, 47.

Na spomenutim starčevačkim lokalitetima pronađeni su neki od Zoharyjevih osam začetničkih usjeva definiranih 1996. godine, što dokazuje da su ovi rani lokaliteti imali dobar temelj za razvijanje sve složenijih metoda zemljoradnje. Ipak, u regiji nema dokaza koji bi govorili u prilog ekstenzivnoj zemljoradnji velikih razmjera.⁵⁶ Ostaci biljaka ukazuju na činjenicu da se populacija i dalje uvelike oslanjala na lokalno dostupne biljne resurse, što dodatno dokazuju istovremeni starčevački slojevi s lokaliteta Sopot, gdje su pronađeni dvozna pšenica, jednorna pšenica, ječam, grašak, ljuskavac i divlje trave⁵⁷ te nalazi s lokaliteta u široj geografskoj regiji, uključujući Mađarsku, Srbiju te Bosnu i Hercegovinu.⁵⁸

Sopotska kultura

Sopotska kultura je predstavnik klasične zemljoradničke neolitičke privrede.⁵⁹ Razvila se na temeljima kasne starčevačke kulture, pod snažnim utjecajima iz kruga vinčanske kulture, a rasprostirala se u većem dijelu sjeverne Hrvatske, tijekom srednjega i kasnog neolitika. Nositelji sopotske kulture živjeli su u naseljima smještenim u nizinskim, često močvarnim predjelima, uvijek u neposrednoj blizini vode.⁶⁰ Naselja su najčešće ravninarska i neutvrđena, s jamskim i nadzemnim objektima, što znači da su bila sezonskog karaktera. Mogla su poslužiti za potrebe ekstenzivne zemljoradnje i korištenja drugih prirodnih resursa na tome području.⁶¹ Osnova sopotske ekonomije sigurno je bila zemljoradnja, odnosno stočarstvo.⁶²

gion.⁵⁶ The remains of fruit point to the fact that the population still relied on exploiting locally available plant resources, as additionally shown by the example of the contemporary Starčevo layers at Sopot, which yielded the remains of emmer, einkorn, barley, pea, Chinese Lantern and wild grasses,⁵⁷ and finds from sites in the wider geographical region, including Hungary, Serbia and Bosnia and Herzegovina.⁵⁸

The Sopot culture

The Sopot culture is a representative of a classic Neolithic agricultural economy.⁵⁹ It developed on the foundations of the Starčevo culture under strong influence from the circle of the Vinča culture, and covered most of northern Croatia during the middle and late Neolithic. The populations of the Sopot culture settled in valleys, often marshy areas, and always in the vicinity of water supplies.⁶⁰ The settlements are constructed mostly in valleys and have no fortification, with pit-like and aboveground dwellings, which means they were of seasonal character. They could have been used for extensive agriculture and exploitation of other natural resources in the area.⁶¹ The basis of the Sopot economy must have been agriculture, i.e. farming.⁶²

Plant remains from Ivandvor-Šuma Gaj (Table 2) include mostly grain (emmer, einkorn and barley), as well as pulses (lentil and undeterminable pulses), meaning four of the eight 'founding crops'. These finds point to the continued use of the founding crops in the region from early- to middle-Neolithic times. The widening spectrum of cereals could indicate an influx of new species, probably introduced to the region by trade and/or ex-

⁵⁶ Reed 2014a, 1, 6.

⁵⁷ Reed 2014a, 2.

⁵⁸ Colledge, Conolly 2007, 35.

⁵⁹ Dimitrijević 1979a, 270.

⁶⁰ Balen, Burić 2006, 359.

⁶¹ Marijan 2007, 70.

⁶² Krznarić Škrivanko 2003, 679.

⁵⁶ Reed 2014a, 1, 6.

⁵⁷ Reed 2014a, 2.

⁵⁸ Colledge, Conolly 2007, 35.

⁵⁹ Dimitrijević 1979a, 270.

⁶⁰ Balen, Burić 2006, 359.

⁶¹ Marijan 2007, 70.

⁶² Krznarić Škrivanko 2003, 679.

Biljni ostaci s lokaliteta Ivandvor-Šuma Gaj (tablica 2) uglavnom uključuju žitarice (dvozna pšenica, jednozna pšenica i ječam), kao i mahunarke (leća i neodređive mahunarke), odnosno četiri od osam začetničkih usjeva. Nalazi ukazuju na kontinuirano korištenje začetničkih usjeva u regiji od ranog do kasnog neolitika. Sve širi spektar žitarica mogao bi ukazivati na priljev novih vrsta koje su u regiju vjerojatno došle trgovačkim i/ili mrežama razmjene, a ujedno označavaju i moguću potrebu za novim sustavima zemljoradnje koji bi bili potrebni za uzgajanje ovih usjeva.⁶³ Promjene se ne reflektiraju na strukturu prethodno spomenutih starčevačkih i sopotskih naselja.⁶⁴

O korištenju i obradi žitarica na lokalitetu Ivandvor-Šuma Gaj svjedoče i nalazi žrvnjeva, rastirača, te bruseva. Pronađeno je pet žrvnjeva koji potječu iz različitih stratigrafskih jedinica. Jedan žrvanj potječe iz stratigrafske jedinice 41, koja je datirana u razdoblje sopotske kulture, i u kojoj su pronađeni biljni ostaci (zrnje, mekinje, neodredivo). Osim žrvnjeva, na lokalitetu su pronađena i dva rastirača. Jedan od njih potječe iz stratigrafske jedinice 263 koja datira iz razdoblja sopotske kulture i u kojoj su pronađeni biljni ostaci (zrnje, mekinje, neodredivo). Na lokalitetu su pronađena dva brusa uz koje nisu pronađeni biljni ostaci. Jedan je pronađen u stratigrafskoj jedinici 149 (posebni nalaz 20), a drugi u 267 (posebni nalaz 59). Iako brusevi ne dokazuju korištenje žitarica, važan su dio žetelačkog alata i mogu poslužiti kao indirektan dokaz ratarskih aktivnosti. Osim ovih nalaza, na intenzivnu upotrebu biljaka ukazuju i nalazi sjaja srpa na tri lomljene litičke rukotvorine pronađene na lokalitetu.⁶⁵

⁶³ Reed 2014a, 4.

⁶⁴ Balen 2007, 27-29; Balen 2007a, 14-16.

⁶⁵ Balen *et al.* 2009b, 32.

change networks, and, hence, possibly new agricultural systems which would have been necessary for the production of these crops.⁶³ These changes are, however, not reflected in the structure of the settlements at the aforementioned Starčevo and Sopot sites.⁶⁴

The use and processing of cereals at Ivandvor-Šuma Gaj is additionally attested to by finds of grindstones, sickles and whetstones. Five grindstones were found in different stratigraphic units. One of them was found in stratigraphic unit 41, which was dated to the period of the Sopot culture, and which yielded remains of cereals, bran and undeterminable plants. Apart from grindstones, two handstones were also found. One was found in stratigraphic unit 263, which was dated to the Sopot culture and which yielded remains of cereals, bran and undeterminable plants. Two whetstones were also found at the site, one of them in stratigraphic unit 149 (special find 20), and one in 267 (special find 59). Although whetstones do not in themselves prove plants were processed, they are an important part of a farmer's tool kit and can be considered an indirect proof of agricultural activities, most likely in the proximity of the settlement. Along with these finds, specific shine was established on three chipped stone tools, which further proves that plants were processed at the site.⁶⁵

⁶³ Reed 2014a, 4.

⁶⁴ Balen 2007, 27-29; Balen 2007a, 14-16.

⁶⁵ Balen *et al.* 2009b, 32.

Lasinjska kultura

Lasinjska kultura razmjerno je široko rasprostranjena – obuhvaća područje Hrvatske od Vučedola u istočnoj Slavoniji do Josipdola u Ogulinsko-plašćanskoj zavali, sjevernu Bosnu, Sloveniju, Štajersku i Korušku u Austriji te mađarsku Transdanubiju.⁶⁶ Periodizacija srednjeg eneolitika i njegova prijelaza na kasni na prostoru sjeverne Hrvatske, temeljena na novim ¹⁴C datumima, lasinjsku bi kulturu smjestila u razdoblje između 4300. i 3800. pr. Kr.⁶⁷ Ekonomija lasinjske kulture tradicionalno je smatrana stočarskom, zahtijevajući laku pokretljivost populacije, što je rezultiralo prilično kratkim prebivanjem na jednome mjestu. Većina istraženih lasinjskih naselja nam i pokazuje takvu sliku; naime, često je riječ o jednoslojnim naseljima s tankim kulturnim slojem.⁶⁸ Iako pripada razdoblju bakrenoga doba, lasinjsku kulturu odlikuje način života inače karakterističan za mlađe kameno doba. Na lokalitetu Pajtenica-Velike Livade pronađena su tri bakrena artefakta, a nalazi su zasad prvi na prostoru Hrvatske koji se mogu pripisati nositeljima lasinjske kulture.⁶⁹

Biljni ostaci s lokaliteta Pajtenica-Velike Livade i Jurjevac-Stara Vodenica (tablice 3, 4) uglavnom su u kategoriji »neodredivo«, ali ostaci žitarica uključuju ječam, jednozrnu pšenicu, dvozrnu pšenicu, vrste poznate u regiji od ranog neolitika, a pronađeni su i ostaci drijena, šljive, i trave koja nalikuje broćiki, što pokazuje da je populacija iskorištavala lokalno dostupne divlje resurse. Oba lokaliteta uklapaju se u širu sliku ekonomije lasinjske kulture jer je riječ o istom tipu naselja⁷⁰ i na oba su pronađeni ostaci žitarica koje se

The Lasinja culture

The Lasinja culture is widely spread – it covers the area between Vučedol in eastern Croatia and Josipdol in the Ogulin basin, northern Bosnia, Slovenia, Styria and Carinthia in Austria and Hungary.⁶⁶ The chronology of the middle and the transition to the late Copper Age in northern Croatia is based on new radiocarbon dates, and places the Lasinja culture in the period between 4300 and 3800 BC.⁶⁷ Traditionally, the economy of the Lasinja population is said to have been based on cattle-breeding, which required undemanding mobility, resulting in short stays in one area, as suggested by most excavated Lasinja sites: the settlements often have only one thin cultural layer.⁶⁸ Although it is ascribed to the Copper Age, the Lasinja culture shows a more Neolithic way of life. At Pajtenica-Velike Livade, three copper objects were found, and so far these are the only copper finds in Croatia which can be ascribed to the Lasinja culture.⁶⁹

Plant remains from Pajtenica-Velike Livade and Jurjevac-Stara Vodenica (Tables 3 and 4) fall, for the most part, in the indeterminable category, but grain remains include barley, einkorn, emmer, species known in the region since the early Neolithic, as well as remains of cornelian cherry, plum, and a weed resembling lady's bedstraw, showing that the population exploited locally available wild resources. Both sites fit into the wider picture of the Lasinja culture when it comes to the economy, seeing as they are of the same settlement type⁷⁰ and that they yielded grain remains (various types of wheat and barley) typically associated with the Lasinja culture. Fruit remains from Jurjevac-Stara Vodenica include, apart from the standard remains of cornelian cherry, remains of a plant compa-

⁶⁶ Dimitrijević 1979, 139, 140.

⁶⁷ Balen 2008a, 23.

⁶⁸ Balen 1998, 14.

⁶⁹ Balen 2007, 28.

⁷⁰ Balen 2007, 27-29; Balen 2007a, 14-16.

⁶⁶ Dimitrijević 1979, 139, 140.

⁶⁷ Balen 2008a, 23.

⁶⁸ Balen 1998, 14.

⁶⁹ Balen 2007, 28.

⁷⁰ Balen 2007, 27-29; Balen 2007a, 14-16.

tipično pojavljuju u kontekstu lasinjske kulture (različite vrste pšenice i ječam). Biljni ostaci voća s lokaliteta Jurjevac-Stara Vodenica uključuju, osim standardnog nalaza ostataka drijena, i ostatke biljke usporedive s vrstom šljive. Broćika je pronađena na lokalitetu Pajtenica-Velike Livade. Radi se o biljci koja često raste uz nasade pšenice i čiji su plodovi jestivi. To bi moglo značiti da je lasinjska populacija i ovu biljku koristila u svakodnevnoj prehrani. Sve ustanovljene vrste trava rastu uz kultivirane žitarice i dozrijevaju u isto vrijeme godine, što je posebno važno u kontekstu lasinjske kulture jer sugerira da se populacija nije mogla baviti samo transhumantnim stočarstvom, kako se tradicionalno smatra.⁷¹ Barem dio lasinjske populacije morao je živjeti u dugotrajnijim naseljima kako bi se brinuo za usjeve tijekom cijele godine, a čemu u prilog govori i sve veći broj nadzemnih objekata pronađenih na novoistraživanim lokalitetima lasinjske kulture.⁷²

O korištenju i obradi žitarica na lokalitetu Pajtenica-Velike Livade svjedoče i nalazi žrvnjeva te brusa. Pronađeno je sedam žrvnjeva datiranih u razdoblje lasinjske kulture. Svi nalazi žrvnjeva potječu iz stratigrafskih jedinica u kojima su pronađeni biljni ostaci (zrnje, trave, neodredivo). Nalazi potječu iz stratigrafskih jedinica 6 (posebni nalaz 12), 14 (posebni nalazi 36, 37, 41 i 42), 133 (posebni nalaz 48) i 8 (posebni nalaz 56). Brus je pronađen u stratigrafskoj jedinici 8 (posebni nalaz 54), koja je pripisana lasinjskoj kulturi i u kojoj su pronađeni biljni ostaci. Brus je važan dio žetelačke opreme te doprinosi spoznajama o korištenju žitarica u lasinjskom kontekstu na ovome lokalitetu. Davor Špoljar trenutačno provodi analizu litičkog materijala s lokaliteta Pajte-

nable to the species of plum. Lady's bedstraw was found at Pajtenica-Velike Livade. It is a plant which often appears as a weed in wheat fields, but the fruits of which are edible. This could mean that the Lasinja population at the site used it in its everyday diet. All the established weeds grow alongside cultivated cereals and ripen at the same time of the year, which is especially important in the context of the Lasinja culture because it suggests that the population could not have practised only transhumant cattle-breeding, as had been traditionally suggested.⁷¹ At least a portion of the Lasinja population must have lived in permanent settlements in order to take care of the crops during the whole year, as attested to by the increasing number of aboveground facilities found at newly-excavated sites dated to the Lasinja culture.⁷²

The use and processing of plants at Pajtenica-Velike Livade is further attested to by finds of grindstones and whetstones. Seven grindstones which can be dated to the Lasinja culture were found, and all of them in stratigraphic units which also yielded plant remains (cereals, weeds, undeterminable). They were found in stratigraphic units 6 (special find 12), 14 (special finds 36, 37, 41 and 42), 133 (special find 48) and 8 (special find 56). A whetstone was found in stratigraphic unit 8 (special find 54), which yielded plant remains and was ascribed to the Lasinja culture. The whetstone is an important part of a farmer's tool kit and, hence, contributes to our knowledge about the use of cereals in the context of the Lasinja culture at the site. Davor Špoljar conducted an analysis of chipped stone tools from Pajtenica-Velike Livade, and found specific shine on nine artefacts, proving they were used for extensive plant cutting. Fifty-two artefacts showed further evidence of use, and another 20 displayed traces of being used extensively for plant processing.⁷³

⁷¹ Dimitrijević 1979, 146; Homen 1990, 54; Marković 1994, 39; Balen 1998, 14.

⁷² Balen 2010, 39.

⁷¹ Dimitrijević 1979, 146; Homen 1990, 54; Marković 1994, 39; Balen 1998, 14.

⁷² Balen 2010, 39.

⁷³ Verbal account.

nica-Velike Livade, kojom je ustanovio da devet komada lomljene litike pokazuje karakterističan sjaj srpa koji nastaje zbog intenzivnog rezanja biljaka, da se na 52 komada vide tragovi korištenja te da su specifični tragovi upotrebe oruđa vidljivi na 20 komada.⁷³ Ovi su tragovi dodatan dokaz procesuiranja žitarica u lasinjskom kontekstu, na lokalitetu Pajtenica-Velike Livade.

Korištenje i procesuiranje biljaka na lokalitetu Jurjevac-Stara Vodenica dokazuje i nalaz žrvnja. Iako nalaz nije bio u asocijaciji s biljnim ostacima, njegova je namjena jasna. Žrvanj je pronađen u stratigrafskoj jedinici 200 (posebni nalaz 10), a dokazuje da su se biljke, vjerojatno žitarice, obrađivale na samom lokalitetu. Davor Špoljar trenutno provodi analizu kamenih oruđa s lokaliteta Jurjevac-Stara Vodenica i ustanovio je da se tragovi sjaja srpa, za koje se smatra da nastaju kao posljedica intenzivnog korištenja oruđa pri rezanju biljaka, pojavljuju na dvije ruktvorine. Iskrzanost ruba ustanovio je na devet ruktvorina, dok su specifični tragovi upotrebe, tzv. ogrebotine koje nastaju rezanjem biljaka, zabilježene na pet ruktvorina.⁷⁴ Jurjevac-Stara Vodenica jedini je lokalitet na kojem su pronađeni ostaci biljke usporedive s vrstom šljive što, iako se radi o malom uzorku, sugerira da je lasinjska populacija na ovome lokalitetu koristila i tu biljku u prehrani. Važno je istaknuti da je riječ o divljoj vrsti, što znači da se prehrana populacije nije temeljila samo na kultiviranim biljkama. Zanimljivo je i to da su svi ostaci voća pronađeni u istoj stratigrafskoj jedinici - 147.

Važno je istaknuti činjenicu da se spektar korištenih biljaka, kako kultiviranih tako i divljih, samo neznatno povećava u usporedbi s drugim ranijim i istovreme-

These traces can be seen as indirect proof of plant processing Pajtenica-Velike Livade.

The use and processing of plants at Jurjevac-Stara Vodenica is additionally attested to by a grindstone. Although it was not found in association with plant remains, its intended use is clear. It was found in stratigraphic unit 200 (special find 10) and proves that plants, most likely cereals, were processed at the site. Davor Špoljar conducted an analysis of chipped stone tools from Jurjevac-Stara Vodenica and found specific shine, proving plant cutting, on two artefacts. He also found edge chipping on nine artefacts and specific traces left by plant processing on another five.⁷⁴ Jurjevac-Stara Vodenica is the only site which yielded remains comparable to the species of plum, which suggests, although the sample is very small, that the Lasinja population at this site used that plant in their diet. It is important to note that this is a wild plant, which means that the population's diet was not based solely on cultivated plants. It is also interesting that all fruit remains were found in the same stratigraphic unit: 147.

It is important to highlight the fact that the spectrum of used plants, both cultivated and wild, widens only slightly in comparison with other sites and established cultural occurrences, both earlier and contemporary. Other archaeological finds also do not differ greatly from those found at other sites in the Đakovo region, which suggests that the population did not undergo a sudden change in its economy in the sense of shifting from intensive to extensive cultivation (which would require a much larger occupational area and mobility), as traditionally suggested.

⁷⁴ Verbal account.

⁷³ Usmeno priopćenje.

⁷⁴ Usmeno priopćenje.

nim lokalitetima te utvrđenim kulturnim pojavama. Ni ostali se arheološki nalazi znatno ne razlikuju od onih na drugim lokalitetima Đakovštine, što sugerira da populacija nije doživjela tradicionalno predlaganu naglu promjenu u ekonomiji u smislu prijelaza s intenzivne na ekstenzivnu zemljoradnju (koja bi zahtijevala mnogo veće područje za život i veću mobilnost).

Kostolačka kultura

Kostolačka kultura je kasnoeneolitička manifestacija koju stilski karakterizira način ukrašavanja keramike – brazdasto urezivanje i ubadanje, a rasprostire se na području Karpatske kotline, na dijelovima središnjeg i sjevernog Balkana i rumunjskog Podunavlja.⁷⁵ Kao samostalna pojava, u arheološkoj literaturi pojavljuje se od 1953. godine, a sva poznata naselja podignuta su uz veće ili manje vodotoke koji su zadovoljavali osnovne uvjete za život,⁷⁶ što je slučaj i s nalazištem Đakovo-Franjevac. Od svakodnevnih uporabnih predmeta na Franjevcu su pronađeni keramički pršljenci za vretena i kalemovi te veći utezi kružnoga ili piramidalnog oblika. Koštana i kamena produkcija pokazuje standardne odlike. Zastupljena je lomljena litika: jezgre, sječiva, grebala, strugala, odbojci i krhotine te glačana kamena oruđa. Zastupljena su i koštana šila koja su vjerojatno služila za ukrašavanje keramike. Na nalazištu je pronađeno šest bakrenih predmeta, uglavnom šila, i jedan ulomak mogućeg bodeža.⁷⁷

Nalazi biljnih ostataka s lokaliteta Đakovo-Franjevac uklapaju se u standardnu sliku eneolitičke ekonomije srednje i jugoistočne Europe, odnosno na lokalitetu

The Kostolac culture

The Kostolac culture is a late Copper Age manifestation stylistically characterized by decorations on pottery – furrowing and impressing – and which covers the Carpathian basin, parts of the central and northern Balkans and the Rumanian Danubian region.⁷⁵ As a separate occurrence in archaeological writing, it first appeared in 1953, and all known settlements are situated on raised positions near rivers or streams which could satisfy basic needs.⁷⁶ This is also the case with Đakovo-Franjevac. Many everyday objects were found at the site, one of the biggest settlements of its type in the region, including whorls, spindles and bigger round or pyramidal weights. Bone and stone artefacts are typical of the period. Some chipped stone tools were found as well: cores, blades, end-scrapers, side-scrapers, flakes and shards, as were polished stone implements. Bone awls were also found, which were probably used for decorating pottery. Six copper objects were found, mostly awls, and one possible dagger fragment.⁷⁷

Finds of plant remains from Đakovo-Franjevac fit into the standard picture of the Copper Age economy in central and southeastern Europe, meaning that the site yielded plant remains which have been found at other sites, e.g. at Pajtenica-Velike Livade and Jurjevac-Stara Vodenica which are in the same region and are dated to the Copper-Age Lasinja culture. This is the site with the widest spectrum of established plant remains in all analysed categories, and the only site which yielded oil-plant remains, which suggests that the diet of the Kostolac population might have been more complex than that of older cultural groups established in the same region. However, this might also be due to the fact that the largest number of samples

⁷⁵ Tasić 1979, 235, 237.

⁷⁶ Balen 2002, 35.

⁷⁷ Balen 2008, 11.

⁷⁵ Tasić 1979, 235, 237.

⁷⁶ Balen 2002, 35.

⁷⁷ Balen 2008, 11.

su pronađene biljke kojih ima i na drugim lokalitetima, primjerice Pajtenica-Velike Livade i Jurjevac-Stara Vodenica koji se nalaze u istoj regiji i datirani su u razdoblje eneolitičke lasinjske kulture. Na ovom je lokalitetu utvrđen najširi spektar biljnih ostataka u svim analiziranim kategorijama i jedini lokalitet na kojem su pronađene uljarice, što ukazuje na mogućnost da je prehrana kostolačke populacije mogla biti složenija od one starijih kulturnih grupa u regiji. Ipak, ovakva situacija može biti posljedica činjenice da je s ovog lokaliteta uzet najveći broj uzoraka ili toga da su uzorci mogli biti najbolje očuvani. Žitarice tvore većinu utvrđenih biljnih ostataka, a uključuju jednozrnu pšenicu, dvozrnu pšenicu, ječam, običnu pšenicu i proso. Ostaci voća uključuju drijen, koji je pronađen i u lasinjskim kontekstima, te bazgu, ljuskavac i malinu. Na lokalitetu je pronađeno i petnaest divljih vrsta trava (kukolj, ovsik, grab, pepeljuga, bročika, velike trave, male trave, ljulj, mačica, oštrik, zeleni muhar, mahunarke sitnog sjemena, pomoćnice i dubčac). Vjerojatno su najvažniji ostaci biljke pepeljuge, vrste koja se povezuje s proljetnom sjetvom.⁷⁸ Ostaci mahunarki uključuju grahor, leću i grašak. Uljarice su predstavljene nalazom lana.

Osim biljnih vrsta, nalazi s lokaliteta upućuju na skupljanje i drugih vrsta hrane iz prirode. Ostaci pčelinjeg voska u amfori iz Franjevca pokazuju da je kostolačka populacija koristila med, ali ne može se sasvim sigurno govoriti o držanju meda u amforama jer se nalaz voska može tumačiti i premazivanjem stijenki posuda radi neporoznosti. Pretpostavlja se da je kostolačka populacija do meda dolazila sakupljanjem iz prirode, odnosno iz obližnjih šuma (tzv. *honeyhunting*).⁷⁹ O korištenju i obradi žitarica na lokalitetu

was taken from this site and that the samples might have been better preserved. Grain makes up most of the established plant remains, and includes einkorn, emmer, barley, bread wheat and millet. Fruit remains include cornelian cherry, which was also found in the Lasinja culture, as well as danewort, Chinese lantern and raspberry. A total of fifteen different types of wild weeds were found at the site (corncockle, bromus, hornbeam, white goosefoot, lady's bedstraw, large grasses, small grasses, ryegrass, catstail, birdgrass, green foxtail, small seeded legumes, nightshades and teucrium). Perhaps the most important are the remains of white goosefoot, a plant associated with spring-sowing of crops.⁷⁸ Remains of pulses include grass pea, lentil and pea. Oil plants are represented by a find of flax.

Besides plant remains, finds from the site point to the collecting of other types of food. Honeybee wax was found in an amphora from Đakovo-Franjevac, which may suggest that the Kostolac population used honey, but it cannot be ascertained that it was kept in amphorae, because the wax could have been used as a means to make the pottery nonporous. It is assumed that the Kostolac population gathered honey from nature, that is, from the nearby forests (so-called *honeyhunting*).⁷⁹ The use and processing of plants at Đakovo-Franjevac is additionally attested to by finds of grindstones and handstones. Nine grindstones were found, five from stratigraphic unit 160 (special finds 43, 123, 146, 219, 242), which was dated to the Kostolac culture, and in which plant remains were found (cereals, bran, pulses, fruit, weeds, undeterminable). Two handstones were also found, one of them from the same stratigraphic unit, 160 (special find 11), and the other from stratigraphic unit 249 (special find 80). Both units were dated to the Kostolac culture and also contained plant remains. The use of plants is additionally at-

⁷⁸ Bogaard, Jones, Charles 2005, 505.

⁷⁹ Balen 2010, 102.

⁷⁸ Bogaard, Jones, Charles 2005, 505.

⁷⁹ Balen 2010, 102.

Đakovo-Franjevac svjedoče i nalazi žrvnjeva te rastirača. Pronađeno je devet žrvnjeva, od kojih pet potječe iz stratigrafske jedinice 160 (posebni nalazi 43, 123, 146, 219, 242) koja je datirana u razdoblje kostolačke kulture i u kojoj su pronađeni biljni ostaci (zrnje, mekinje, zrna mahunarki, voće, trave, neodredivo). Pronađena su i dva rastirača. Jedan od njih također potječe iz stratigrafske jedinice 160 (posebni nalaz 11), a drugi iz stratigrafske jedinice 249 (posebni nalaz 80). Obje jedinice su iz kostolačkog vremena, a u njima su pronađeni i biljni ostaci. Korištenje biljaka dodatno dokazuju nalazi sjaja srpa na lomljenim litičkim oruđima. Maja Bunčić je analizom utvrdila da je sjaj srpa vidljiv na 161 sječivu, odnosno njihovim ulomcima, što iznosi 28,8% od ukupno pronađenih.⁸⁰ Osim žrvnjeva i rastirača, na lokalitetu je pronađeno šest bruseva od kojih su dva iz kostolačkih konteksta u kojima su pronađeni biljni ostaci. Radi se o nalazima iz stratigrafske jedinice 638 (posebni nalaz 89) i iz stratigrafske jedinice 160 (posebni nalaz 121).

Zaključna razmatranja

Nakon usporedbe biljnih ostataka pronađenih na sva četiri lokaliteta, određene su generalne tendencije u korištenju i uzgajanju biljaka tijekom neolitika i eneolitika na prostoru Đakovštine. Proizvodnja hrane na prostoru Hrvatske, koja je na kraju postavila temelje neolitičke ekonomije i omogućila njezino širenje, počela je kultivacijom navedenih začetničkih usjeva,⁸¹ prije svega, kako pokazuju najranija nalazišta starčevačke kulture, pšenice i ječma. Na neolitičkim starčevačkim i sopotskim lokalitetima Pajtenica-Velike Livade i Ivandvor-Šuma Gaj, pronađene su jednorna pšenica, dvozna pšenica, ječam i leća, četiri od Zoharyjevih osam začet-

tested to by specific shine found on chipped stone tools. Maja Bunčić has established this kind of shine on 161 blades and blade fragments, which is 28.8% of the total number.⁸⁰ Apart from grindstones and handstones, six whetstones were found, two from Kostolac contexts which also yielded plant remains. The whetstones were found in stratigraphic units 638 (special find 89) and 160 (special find 121).

Concluding remarks

Plant remains obtained from all four sites were compared, and general tendencies in using and growing plants during the Neolithic and the Copper Age in the Đakovo region were determined. The production of food on Croatian territory, which ultimately set the basis of the Neolithic economy and enabled it to spread, started with the cultivation of the above-mentioned eight 'founding crops'⁸¹ – primarily, as the earliest sites of the Starčevo culture show, wheat and barley. At the Neolithic Starčevo and Sopot culture sites of Pajtenica-Velike Livade and Ivandvor-Šuma Gaj, Einkorn, emmer, barley and lentil were found: four of Zohary's eight 'founding crops'. Wild weeds and fruits were

⁸⁰ Bunčić 2011.

⁸¹ Zohary 1996.

⁸⁰ Bunčić 2011.

⁸¹ Zohary 1996.

ničkih usjeva. Na ovim lokalitetima nisu pronađene divlje trave i voće. To ne znači da su to bile jedine uzgajane biljke i da divlji resursi nisu iskorištavani, kao što pokazuju i nalazi s drugih rano- i sredne-neolitičkih lokaliteta u regiji, gdje su pronađene različite vrste trava i voća.⁸²

Situacija se malo mijenja dolaskom bakrenog doba koje je u ovom radu predstavljeno nalazima s lokaliteta Pajtenica-Velike Livade, Jurjevac-Stara Vodenica i Đakovo-Franjevac. Ondje je pronađeno šest od osam Zoharyjevih začetničkih usjeva: dvozna pšenica, jednozna pšenica, ječam, grašak, leća i lan. Spektar voća, mahunarki i trava također se znatno proširuje.

Vidljiv je kontinuitet u korištenju žitarica, osobito jednozne pšenice, dvozne pšenice i ječma, kao i u korištenju mahunarki i trava, i to od ranog neolitika do kasnog eneolitika, što ukazuje na postojanje »autohtone biocenoze«, odnosno, ostatke lokalno uzgajanih žitarica i trava koje obično rastu uz njih.⁸³ Razlike, s obzirom na kulturnu atribuciju lokaliteta, očekivane su, a pokazuju da se broj kultiviranih vrsta povećava s vremenom, što pak pokazuje da su se ti zemljoradnici znali prilagoditi klimatskim promjenama koje su se dogodile na prijelazu iz neolitika u eneolitik te da su znali kako profitirati od novonastale situacije. S vremenom se povećava i broj divljih vrsta, što je osobito važno u kontekstu ovdje najmlađe, kostolačke kulture na lokalitetu Đakovo-Franjevac. Iznimno su važni ostaci biljke pepeljuge koja se povezuje s proljetnom sjetvom žitarica i intenzivnom zemljoradnjom malih razmjera,⁸⁴ što pak ukazuje na potrebu za stalnim, trajnim naseljima. U usporedbi sa susjednim regijama,⁸⁵ ana-

not found in the samples taken at these sites. This does not, however, mean that these were the only cultivated plants in use, and that wild resources were not exploited, as attested to by finds from other early and middle Neolithic sites in the region, where different types of weeds and fruit were found.⁸²

The situation changes slightly in the Copper Age, represented in this paper by finds from Pajtenica-Velike Livade, Jurjevac-Stara Vodenica and Đakovo-Franjevac, where six of Zohary's eight 'founding crops' are present: emmer, einkorn, barley, pea, lentil, and flax. The spectrum of fruits, pulses and weeds also increases significantly.

A continuity is seen in the use of cereals, especially einkorn, emmer and barley, as well as in the use of pulses and weeds, from the early Neolithic to the late Copper Age. This points to the existence of 'autochthonous biocenosis', that is, the remains of locally cultivated cereals and weeds which normally appear with them.⁸³ Differences with regard to cultural attribution of the sites are expected and show that the number of cultivated species increases over time, which shows that these farmers knew how to adjust to the climate change noted at the transition between the Neolithic and the Copper Age, and that they were able to benefit from the newly-formed situation. The number of wild species also increases over time, which is especially important in the most recent context presented here, the Kostolac culture at Đakovo-Franjevac. Remains of white goosefoot are especially important, as the plant belongs to a class of weeds associated with spring-sown cereals and small-scale intensive/garden cultivation⁸⁴ and implying a need for permanent, long-term, settlements. In comparison to neighbouring regions,⁸⁵ the analysed sites fit a wider image of the Neolithic and Copper

⁸² Reed 2012; Reed 2014; Reed 2014a.

⁸³ Gyulai, Rudner, Chapman 2010, 304.

⁸⁴ Bogaard, Jones, Charles 2005, 505-506.

⁸⁵ Reed 2012; Reed 2014; Reed 2014a.

⁸² Reed 2012; Reed 2014; Reed 2014a.

⁸³ Gyulai, Rudner, Chapman 2010, 304.

⁸⁴ Bogaard, Jones, Charles 2005, 505-506.

⁸⁵ Reed 2012; Reed 2014; Reed 2014a.

lizirani se lokaliteti uklapaju u širu sliku neolitičke i eneolitičke ekonomije, odnosno, kontekst sedentarnih populacija koje uzgajaju i obrađuju hranu u blizini ili u naseljima, na što ukazuju, osim biljnih ostataka, i nalazi velikih keramičkih posuda, žrvnjeva i rastirača, kao i lomljena litika s tragovima rezanja biljaka.

Age economy, that is, a context of sedentary populations which grow and process food near or at the site, as attested to by finds, in addition to plant remains, of big pottery vessels, grindstones and handstones, as well as chipped stone tools with plant-cutting marks.

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