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In 2021, the Croatian Conservation Institute conducted multidisciplinary conservation-restauration and archaeological research in the northern courtyard of Banski dvori Palace to determine the layers of historical development. The results confirmed the continuity of settlement of the Zagreb upper town plateau from prehistoric times to the present day, and served as a basis for the development of project-technical documentation required for the complete restoration of the Government of the Republic of Croatia building damaged by the 2020 earthquake. During the excavations, remains of a subterranean timber-framed structure were documented. Based on the archaeological finds and context it can be interpreted as the underground storage room of a medieval urban house dated to the period of 13th and 14th century. A total of 1464 plant macrofossils were isolated by archaeobotanical analysis, of which six were carbonized and some of remains were just partially mineralized. The majority of the finds (95%) represent woody edible species with the highest number of finds being grapevine (*Vitis vinifera*), sweet/sour cherry (*Prunus avium/cerasus*), and blackthorn (*Prunus spinosa*). Some woody species such as grapevine and peach (*Prunus persica*) were certainly cultivated, while others like Cornelian cherry (*Cornus mas*) and blackthorn are evidence that the population collected fruits from nature. Edible herbaceous species accounted for 2.12% of the finds, included cucumber (*Cucumis sativus*), spice fennel (*Foeniculum vulgare*), cereals millet (*Panicum miliaceum*) and common wheat (*Triticum aestivum/durum*). More than 40% of the remains were found in five vessels, while the rest were from the surrounding sediment. All vessels contained grapevine and wild apples/pears, and fruits such as sweet/sour cherry, blackberry and plum were also found, leading to the assumption that the vessels contained the commonly used medieval beverage made from unripe fruit, known as verjuice.

KEY WORDS: archaeobotany, ceramic vessels, fruit, medieval period, underground storage room, verjuice

S ciljem utvrđivanja slojeva povijesnog razvoja, Hrvatski restauratorski zavod proveo je 2021. godine multidisciplinarna konzervatorsko-restauratorska i arheološka istraživanja sjevernog dvorišta Banskih dvora. Rezultati su potvrdili kontinuitet naseljavanja zagrebačkoga gornjogradskog platoa od prapovijesti do danas, a poslužili su kao osnova za izradu projektno-tehničke dokumentacije potrebne za cjelovitu obnovu potresom iz 2020. godine oštećene zgrade Vlade Republike Hrvatske. Tijekom istraživanja dokumentirani su ostaci objekta kojeg je na temelju nalaza i konteksta moguće interpretirati kao podzemnu ostavu srednjovjekovne gradske kuće iz 13. i 14. stoljeća. Arheobotaničkom analizom izolirano je 1464 biljnih makrofosila, od kojih ih je šest bilo karbonizirano, a nekolicina uglavnom djelomično mineralizirana. Većina nalaza (95 %) predstavlja drvenaste jestive vrste s najvećim brojem nalaza vinove loze (*Vitis vinifera*), trešnje/višnje (*Prunus avium/cerasus*) i trnjine (*Prunus spinosa*). Neke drvenaste vrste poput vinove loze i breskve (*Prunus persica*) zasigurno su bile uzgajane, a neke poput crvenog drijena (*Cornus mas*) i trnjine dokaz su da je stanovništvo sakupljalo plodove iz prirode. Jestivih zeljastih vrsta je 2,12 %, a radi se o nalazima povrtne vrste krastavac (*Cucumis sativus*), začinske biljke obični komorač (*Foeniculum vulgare*) te žitarica divlji proso (*Panicum miliaceum*) i obična pšenica (*Triticum aestivum/durum*). Više od 40 % ostataka pronađeno je u pet posuda, a ostali su ostaci iz okolnog sedimenta. U svim je posudama pronađena vinova loza i divlja jabuka/krušaka, a pronađeno je i voće poput trešanja/višanja, kupina i šljiva, što nas navodi na pretpostavku da se u posudama nalazio često korišteni srednjovjekovni sok od nezrelog voća tzv. verjuice.

KLJUČNE RIJEČI: arheobotanika, keramičke posude, voće, srednji vijek, podzemna ostava, verjuice

INTRODUCTION

In 2021, the Croatian Conservation Institute conducted multidisciplinary conservation-restauration and archaeological research on the entire complex of Banski dvori Palace, with the aim of creating conditions for the development of project-technical documentation required for the complete restoration of the Government of the Republic of Croatia building damaged by the 2020 earthquake (Fig. 1).

The current architectural complex of Banski Dvori Palace, which encloses the St. Mark's Square in the upper town of Zagreb from the west, was gradually formed throughout the 19th century. In the Middle Ages, a series of houses, facing the street with their shorter side, were located in this area, forming an urban block (*insula*) of medieval Gradec. During the 17th century, houses of prominent magnates and dignitaries were found here, next to St. Ursula's chapel and the city armory in the southern part of the block, which were replaced in the 18th century by Baroque palaces of the Sermage family (in the southern part) and Rauch (in the northern part). Throughout the 19th century, both palaces were gradually united into the unique architectural complex of Banski Dvori Palace,

UVOD

Hrvatski restauratorski zavod proveo je 2021. godine multidisciplinarna konzervatorsko-restauratorska i arheološka istraživanja na cijelom sklopu Banskih dvora, s ciljem stvaranja preduvjeta za izradu projektno-tehničke dokumentacije potrebne za cjelovitu obnovu zgrade Vlade Republike Hrvatske u sklopu plana obnove zgrada oštećenih potresom 2020. godine (sl. 1).

Današnji arhitektonski sklop Banskih dvora, koji zatvara sa zapada Trg sv. Marka na zagrebačkom gornjem gradu, formirao se postupno kroz 19. stoljeće. Na tom se prostoru u razdoblju srednjeg vijeka nalazio niz kuća okrenutih kraćom stranom uz ulicu, koje su formirale gradski blok (insulu) srednjovjekovnog Gradeca. Tijekom 17. stoljeća na tom su se prostoru, uz kapelu sv. Urušule i gradsku oružarnicu na južnom dijelu bloka, nalazile kuće istaknutih magnata i dostojanstvenika, koje su tijekom 18. stoljeća zamijenjene baroknim palačama obitelji Sermage (na južnom dijelu) i Rauch (na sjevernom dijelu). Kroz 19. stoljeće obje palače postupno su objedinjene u jedinstveni arhitektonski sklop Banskih dvora, koji je danas sjedište Vlade Republike Hrvatske. Upravo na prostoru nekadašnje palače Rauch, na sjevernom dijelu arhitektonskog sklopa Banskih dvora, pro-

Fig. 1 — Aerial view of the northern courtyard of Banski dvori after archaeological research (photo by: Skimi64. Ltd.)
Sl. 1 — Pogled iz zraka na sjeverno dvorište Banskih dvora nakon arheoloških istraživanja (snimio: Skimi64. d.o.o.)

which is today the seat of the Croatian Government. Precisely on the site of the former Rauch Palace, in the northern part of the architectural complex of Banski Dvori Palace, archaeological research has confirmed the continuity of settlement of the Zagreb upper-town plateau from prehistoric times to the present.

During the archaeological research of the northern courtyard, numerous finds of remains of residential and economic buildings, town infrastructure and movable archaeological finds from the medieval and modern periods were discovered, enabling the reconstruction of the construction sequence of the central part of the fifth insula. The valuable data obtained from field research and multidisciplinary processing of collected finds and data shed new light not only on the historical development of medieval Gradec but also provide new insights into urban life in European cities from the Middle Ages to the present day. One such discovery

vedena arheološka istraživanja potvrdila su kontinuitet naseljavanja zagrebačkog gornjogradskog platoa od razdoblja prapovijesti sve do danas.

Tijekom arheoloških istraživanja sjevernog dvorišta pronađeni su brojni nalazi ostataka stambenih i gospodarskih objekata, gradske infrastrukture te pokretnih arheoloških nalaza iz srednjovjekovnog i novovjekovnog razdoblja koji omogućavaju rekonstrukciju slijeda gradnje središnjega dijela pete insule. Vrijedni podaci dobiveni terenskim istraživanjem te multidisciplinarnom obradom prikupljenih nalaza i podatka bacaju novo svjetlo ne samo na povijesni razvoj srednjovjekovnog Gradeca, već pružaju nove spoznaje o gradskom životu europskih gradova od srednjega vijeka do danas. Jedna od takvih svakako su arheobotanički nalazi pronađeni tijekom istraživanja ukopanog drvenog objekta (u daljnjem tekstu objekt) kojeg je moguće interpretirati kao ostatak podzemne ostave srednjovjekovne gradske kuće iz 13. i 14. stoljeća (sl. 2).

is the archaeobotanical finds found during the research of the subterranean timber-framed structure (hereinafter referred to as structure), which can be interpreted as a remnant of a medieval underground storage room from the 13th and 14th centuries (Fig. 2).

Archaeobotanical research of medieval sites in Croatia is still quite rare (Reed 2016: 7–28). So far, two cremation cemeteries in continental Croatia have been investigated (Sekelj Ivančan, Tkalčec 2006: 141–212; Papeša et al. 2015: 261–288), and analyses of plant macrofossils from the Vrbovec burg in Klenovec Humski (Šoštarić, Šegota 2010a: 247–253), from the medieval sites of Torčec and Torčec – Gradić near Koprivnica (Šoštarić 2004: 107–115; Šoštarić, Šegota 2010b: 373–388), and from the remains of a bread oven in a rural single-room house at the Virovitica Kiškorija South site (Šoštarić 2015: 311–327) have also been published. The most recent archaeobotanical study of Croatian medieval sites (Reed et al. 2021: 347–361) includes results from 10 archaeological sites of medieval settlements or defensive positions in the area of Slavonia. Most of the samples were collected from pits found during the construction of the Beli Manastir – Osijek highway route, while the remaining samples were collected from the floors of medieval rural buildings, the courtyard of a fortress, and within a guard tower.

Arheobotanička istraživanja srednjovjekovnih lokaliteta u Hrvatskoj još uvijek su prilično rijetka (Reed 2016: 7–28). Do sada su istražena dva paljevinska groblja u kontinentalnoj Hrvatskoj (Sekelj Ivančan, Tkalčec 2006: 141–212; Papeša et al. 2015: 261–288), a objavljene su također analize biljnih makrofosila iz burga Vrbovec u Klenovcu Humskome (Šoštarić, Šegota 2010a: 247–253), sa srednjovjekovnih lokaliteta Torčec i Torčec – Gradić kraj Koprivnice (Šoštarić 2004: 107–115; Šoštarić, Šegota 2010b: 373–388) te iz ostataka krušne peći iz ruralne jednoprostorne kuće s lokaliteta Virovitica Kiškorija jug (Šoštarić 2015: 311–327). Posljednji objavljen arheobotanički rad s hrvatskim srednjovjekovnim lokalitetima (Reed et al. 2021: 347–361) obuhvaća rezultate s 10 arheoloških nalazišta srednjovjekovnih naselja ili obrambenih položaja na području Slavonije. Najveći dio uzoraka sakupljen je iz jama koje su pronađene pri gradnji trase autoputa Beli Manastir – Osijek, a ostali uzorci sakupljeni su s podova srednjovjekovnih ruralnih objekata, iz dvorišta utvrde i unutar stražarske kule.

Kontekst iz kojeg su prikupljani do sada analiziranu uzorci je raznolik, no generalno se može reći da su na dosadašnjim lokalitetima dominantni nalazi žitarica. Nalazi obične pšenice (*Triticum aestivum/durum*) i prosa (*Panicum miliaceum*) su najbrojniji i prisutni na preko 80 % lokaliteta, ali na raznim lokalitetima postoje i sporadični nalazi raži (*Secale cereale*), zobi (*Avena sativa*), ječma

Fig. 2 — Structure during archaeological research, possibly underground storage room (photo by: P. Sekulić)
Sl. 2 — Objekt tijekom arheoloških istraživanja, moguća podzemna ostava (snimio: P. Sekulić)

The context from which the analyzed samples have been collected so far is diverse, but it can generally be concluded that cereal finds have been dominant at the previous sites. Common wheat (*Triticum aestivum/durum*) and millet (*Panicum miliaceum*) are the most numerous cereals and present at over 80% of the sites, but in numerous sites, there is also sporadic evidence of rye (*Secale cereale*), oats (*Avena sativa*), barley (*Hordeum vulgare*), and other wheat species (*T. monococcum, T. dicoccum*), although in smaller quantities (Reed et al. 2021: 347–361).

Fruit (and vegetable) finds are quite rare at so-far archaeobotanically investigated Croatian medieval sites, so the results of the present research will primarily contribute to new knowledge about the use of this group of plant taxa. We will place special emphasis in this paper on fruit found within clay vessels, as their common storage provides an excellent basis for discussing which foods or drinks were most likely made of them.

Archaeological context of the findings

Thanks to the privileges granted by King Bela IV, the settlement of Gradec in Zagreb gained the status of a royal free city in 1242. The flourish of trade activities during the 14th century, resulted in growth of craftsmanship and trade. Due to its location, the mint and the position of the tax center of medieval Slavonia, Gradec became an important financial and transportation center of the Croatian and Hungarian Kingdom (Škreblin 2015: 14). Gradec experienced its "golden age" in the second half of the 14th century, primarily due to favorable economic circumstances in the Kingdom, but also due to the "Mediterranean orientation" of the Angevin dynasty, for whom Gradec was an important point on the way to Dalmatia and the Kingdom of Naples (Škreblin 2015: 14). During this period, around 400 houses, and about 3,000 inhabitants[1] were located in Gradec (Krivošić 1981: 55).

Within the city walls, houses were organized into nine blocks, i.e. insules According to V. Bedenko's opinion, the medieval insular organization has been preserved to this day, and the current layout of the upper town streets is precisely a reflection of medieval insules (Škreblin 2015: 106). In the Middle Ages, the fifth insula (of approximate dimensions 70 x 50 m) was located at the site of today's Banski dvori, which closed

1 Including houses and inhabitants in the city suburb.

(*Hordeum vulgare*) i drugih vrsta pšenice (*T. monococcum, T. dicoccum*), premda u manjoj količini nalaza (Reed et al. 2021: 347–361).

Nalazi voća (i povrća) prilično su pak rijetki na do sada arheobotanički istraženim hrvatskim srednjovjekovnim nalazištima pa će rezultati ovog istraživanja prvenstveno doprinijeti novim spoznajama o korištenju te skupine biljnih vrsta. Poseban ćemo naglasak u ovom radu staviti na voće koje je pronađeno unutar keramičkih posuda jer njihova zajednička pohrana predstavlja odličan temelj za raspravu o tome koja su se jela ili pića najvjerojatnije od njih izrađivala.

Arheološki kontekst nalaza

Zahvaljujući povlasticama kralja Bele IV. naselje na brdu Gradec u Zagrebu steklo je status slobodnog kraljevskog grada 1242. godine. Jačanjem trgovačke aktivnosti tijekom 14. stoljeća dolazi do razvoja obrtništva i trgovine, a zahvaljujući svojem prometnom položaju, kovnici novca te položaju carinskog središta srednjovjekovne Slavonije, Gradec postaje važan financijski i prometni centar Ugarsko-hrvatskog Kraljevstva (Škreblin 2015: 14). Gradec će svoje „zlatno doba“ proživjeti baš u drugoj polovici 14. st. zahvaljujući prije svega povoljnim ekonomskim okolnostima u Kraljevstvu, ali i „mediteranskoj orijentaciji“ Anžuvinske dinastije kojima je zbog toga Gradec bio važna točka na putu prema Dalmaciji i Napuljskom kraljevstvu (Škreblin 2015: 14). U tom se razdoblju na Gradecu nalazilo oko 400 kuća, odnosno oko 3000 stanovnika[1] (Krivošić 1981: 55).

Unutar gradskih zidina kuće su formirale devet blokova, tj. insula. Prema mišljenju V. Bedenka takva prostorna organizacija sačuvala se do danas, odnosno današnji razmještaj gornjogradskih ulica odraz je upravo srednjovjekovnih insula (Škreblin 2015: 106). Na mjestu današnjih Banskih dvora u razdoblju srednjega vijeka nalazila se peta insula (približnih dimenzija 70 x 50 m) koja je sa zapada zatvarala glavni gradski trg s crkvom sv. Marka (Škreblin 2015: 107). Prema popisu iz 1368. godine moguće je utvrditi da se sastojala od deset i pol kurija (*curia*).[2] Iz sačuvanog popisa nažalost nije moguće utvrditi točan položaj određenih ku-

1 Uključujući kuće i stanovnike u gradskom podgrađu.

2 Termin kurija u razdoblju 14. i 15. stoljeća odnosila se na dvorno mjesto (grunt, parcelu) odnosno mjeru veličine koja je bila osnovica za razrezivanje poreza. S vremenom su se prvotne kurije dijelile nasljeđivanjem i kupoprodajom a usporedno su se neke povezivale u veće posjede (Bedenko 1989: 31). Na temelju pretpostavke da je izvorna gradska kurija bila površine oko 400 m2, V. Bedenko je pretpostavio da su gradske kurije bile dimenzija oko 13,5 m u širinu te između 25 i 27 m u dubinu (Bedenko 1989: 95).

the main city square with the Church of St. Mark from the west (Škreblin 2015: 107). According to the census from 1368, it is possible to determine that the insula consisted of ten and a half curias (*curiae*).[2] Unfortunately, it is not possible to determine the exact position of the court places and buildings within the insula from the preserved census. Among the owners were prominent citizens such as former city judge Paul, Florentine merchant and sworn member Anthony, and the son of Ban Mikac and (later) Ban Akuš (Tkalčić 1905: 229). Although it is not possible to determine the occupation of all those listed based on the census, in 1368, the houses belonged to a judge (Paul), a priest (Jacob), a sword maker (Jaklin), tailors (Ladimer and Dominic), and a butcher (Andrew) (Tkalčić 1905: 243).

Medieval houses on Gradec were made of stone and/or wood,[3] with their narrower side facing the city streets. In the courtyard space of the houses, there were gardens, bread ovens, various economic buildings, and buried objects such as wells, cisterns, cellars, toilets, i.e., septic tanks.

In the northwest part of the archaeologically excavated section of the northern courtyard, the remains of a subterranean timber-framed structure (SU 090) with a square floor plan (1.60 x 1.60 m, average height 156.97 m a.s.l., average preserved depth of the structure 0.70 m) were documented. The side walls of the structure were lined with wooden planks secured with vertical beams at the corners of the structure. Given the spatial location of the discovered structure, it is possible to assume that it is the remains of a cellar that was secondarily used for waste disposal, or the remains of a septic tank (Fig. 3).

Several challenges appeared during the interpretation of the found subterranean timber-framed structure. Namely, such structures were often only partially preserved due to intensive centuries-long construction activity in the medieval Gradec area. In this case, the investigated structure is preserved only in the lower zone, preventing determination of the original depth of the structure, and the existence and appearance

2 The term curia during the 14th and 15th centuries referred to a courtly place (a plot or parcel of land) or a unit of measurement for the basis of taxation. Over time, the original "kurije" were divided through inheritance and sale, and some were consolidated into larger estates (Bedenko 1989:31). Based on the assumption that the original urban "kurija" was around 400 m2 in size, V. Bedenko speculated that urban "kurije" were about 13.5 m wide and between 25 and 27 m deep (Bedenko 1989: 95).

3 In some cases, the ground floor was made of stone while the upper floor was made of wood, while in other cases the front (street-facing) part of the house could be made of stone, while the back was made of wood (Tkalčić 1904: VII; 1905: II–III).

rija i objekata unutar insule. Među vlasnicima su se nalazili istaknuti građani poput bivšeg gradskog suca Pavla, firentinskog trgovca i prisežnika Antuna te sina bana Mikca i (kasnije bana) Akuša (Tkalčić 1905: 229). Iako na temelju popisa nije moguće odrediti zanimanje svih navedenih, tu su se 1368. godine nalazile kuće suca (Pavao), svećenika (Jakob), izrađivača mačeva (Jaklin), krojača (Ladimer i Dominik) i mesara (Andrija) (Tkalčić 1905: 243).

Srednjovjekovne kuće na zagrebačkom Gradecu bile su zidane i/ili drvene[3] te užom stranom okrenute prema gradskim ulicama. U dvorišnom prostoru kuća nalazili su se vrtovi, krušne peći, različiti gospodarski objekti te ukopani objekti poput zdenca, cisterne, podruma ili zahoda, odnosno septičke jame.

U sjeverozapadnom dijelu arheološkog iskopa sjevernog dvorišta dokumentirani su ostaci drvenog ukopanog objekta (SJ 090) kvadratnog tlocrta (1,60 x 1,60 m, prosječne visine dna 156,97 m n.v., prosječna sačuvana dubina objekta 0,70 m). Bočne stjenke objekta obložene su drvenim daskama učvršćenim vertikalnim gredama u kutovima objekta. S obzirom na prostorni položaj pronađenog objekta moguće je pretpostaviti da je riječ o ostacima podzemnog podrumskog objekta koji je sekundarno korišten za bacanje otpada ili je riječ o ostacima septičke jame zahoda (sl. 3).

Prilikom interpretacije pronađenog drvenog objekta pojavilo se nekoliko izazova. Naime, uslijed intenzivne višestoljetne graditeljske aktivnosti na prostoru srednjovjekovnog Gradeca starije strukture najčešće su sačuvane samo djelomično. U ovome slučaju istraženi objekt sačuvan je tek u donjoj zoni, što onemogućava određivanje izvorne dubine objekta te postojanje i izgled pretpostavljenih nadzemnih struktura. Također, sjeverni dio objekta uništen je izgradnjom zidanog kanalizacijskog sustava (SJ 48) krajem 19. stoljeća, prilikom čega je i djelomično narušena stratigrafska slika.

Drugi izazov predstavljala je je konstrukcijska sličnost vodosprema, podrumskih spremišta i septičkih jama te česta sekundarna uporaba presušenih bunara, starih vodosprema ili podruma za odlaganje otpada (Havlíček et al. 2017: 269). S obzirom na arheološki kontekst i položaj objekta s velikom vjerojatnošću pretpostavljamo kako nije riječ o ostatku bunara ili vodospreme. S druge strane, nije moguće odbaciti mogućnost da je

3 U nekim slučajevima, prizemlje je bilo zidano a kat izgrađen od drveta, dok je u drugim slučajevima prednji (ulični) dio kuće mogao biti zidan, a stražnji od drveta (Tkalčić 1904: VII; 1905: II–III).

Fig. 3 — Detail of the wooden framework of the structure during archaeological research (photo by: P. Sekulić)
Sl. 3 — Detalj drvene oplate objekta tijekom arheoloških istraživanja (snimio: P. Sekulić)

of presumed above-ground structures. Also, the northern part of the structure was destroyed by the construction of a masonry sewerage system (SU 48) at the end of the 19th century, partially disturbing the stratigraphic image.

The second challenge was the structural similarity of water reservoirs, basement storages, and septic tanks, and also the frequent secondary use of dried wells, old water reservoirs, or basements for waste disposal (Havlíček et al. 2017: 269). Considering the archaeological context and the position of the structure, it is highly likely to assume that documented structure was not used as a well or water reservoir. On the other hand, the possibility that it was used as a septic[4] or waste pit cannot be ruled out. Indeed, the walls of septic pits were usually lined with wooden paneling (sometimes a buried barrel) and later brick, and above them, there was typically a toilet (Latin *latrina*, *cloaca*, or *locus necessarii*; Medieval Croatian *wihodnya*) (Bedenko 1989: 89; Haidvogl et al. 2018: 731; Arndt 2020: 223–224). Considering the hygienic component of waste management, the position of the septic pit on the plot was legally determined,

riječ o ostatku septičke[4] ili otpadne jame. Naime, stjenke septičkih jama najčešće su bile obložene drvenom oplatom (ponekad ukopana bačva) te kasnije opekom, a iznad njih se najčešće nalazio zahod (lat. *latrina*, *cloaca* ili *locus necessarii*, srv. hrv. *wihodnya*) (Bedenko 1989: 89; Haidvogl et al. 2018: 731; Arndt 2020: 223–224). S obzirom na higijensku komponentu gospodarenja otpadom, položaj septičke jame na parceli bio je zakonski određen, pa je tako u slučaju Gradeca odredbama gradskog statuta udaljenost zahoda, jame ili gnojnice propisana na tri lakta od susjedne kuće (Tkalčić 1900: XV). Isto tako, s obzirom na činjenicu da su takvi objekti korišteni relativno dugo[5] te da su bili (barem djelomično) redovito pražnjeni, datiranje takvih objekata predstavlja veliki problem (Havlíček et al. 2017: 271).

Prilikom istraživanja uklonjeni su slojevi nastali kasnijim građevinskim intervencijama te je dokumentiran djelomično sačuvani tanki sloj vapna (SJ 91), koji je moguće interpretirati kao trag sanacije odnosno neutralizacije neugodnih mirisa i potencijalnih higijenskih problema. Upravo je taj

4 The term “septic tank“ refers to a structured pit or underground container designed for the collection of sewage and wastewater. Based on the current level of research, it is not possible to determine whether they were used exclusively for sewage or for other waste as well.

4 Termin septička jama odnosi se na uređenu jamu ili podzemni spremnik za sakupljanje fekalija i otpadnih voda. Na temelju sadašnjeg stanja istraženosti nije moguće odrediti jesu li korištene isključivo za fekalije ili i za ostali otpad.

5 Procjenjuje se da je jame bilo potrebno prazniti svakih tri do pet godina te da su se mogle koristiti dvadeset do trideset godina (Havlíček et al. 2017: 271).

and in the case of Gradec, the city statute prescribed the distance of the toilet, pit, or manure pit as three cubits from the neighboring house (Tkalčić 1900: XV). Also, considering that such structures were used relatively long[5] and were (at least partially) regularly emptied, precise dating of this kind of structures presents a significant problem (Havlíček et al. 2017: 271).

During the research, layers created by later construction interventions were removed, and a partially preserved thin layer of lime (SU 91) was documented, which can be interpreted as a trace of sanitation or neutralization of unpleasant odors and potential hygienic problems. It was this finding that suggested that the discovered structure was used as a septic or waste pit at some point. At the very bottom of the structure, in a layer of damp brown soil (SU 89),[6] remains of five fully preserved ceramic pots were found, filled with organic samples. Also, a larger quantity of scattered organic samples was found. Since the mentioned findings were found at the contact of the fill layer and sterile soil, it can be assumed that they are findings from the oldest documented phase of the structure. Considering the archaeological context and findings, it can be assumed that the investigated structure originally served as an underground storage/pantry.

Two wood samples were taken from the structure (UBA-45167, UBA-45169)[7] and were dated using radiocarbon method to the last quarter of the 13th century. However, when interpreting the data, the so-called "old wood effect" should be considered, which means that the range of dates may be wider depending on the time when the wood was cut, the secondary use, and the longer period of use of the structure. The third sample (UBA-48654)[8] sent for radiocarbon dating was a seed sample from the vessel fill (SF 60), which was dated to the mid-14th century. Based on the archaeological context and collected data, with certain precautions, the finds from the investigated structure can be dated to the period of the end of the 13th and the first half of the 14th century.

5 It is estimated that the pits needed to be emptied every three to five years and could have been used for twenty to thirty years (Havlíček et al. 2017: 271).

6 Due to challenging research conditions caused by the leakage of sewage from the active sewer system, the archaeological layer in question could only be identified in the southwestern part of the structure.

7 The radiocarbon dating analysis was conducted at the ^{14}Chrono Centre, Queen's University Belfast. The median value obtained by the radiocarbon dating method for sample UBA-45167 is AD 1273, and for sample UBA-45169 it is AD 1293 (Sekulić 2022: Annex 8.2).

8 The median value obtained by the radiocarbon dating method for sample UBA-48654 is AD 1349.

nalaz sugerirao da je pronađeni objekt u nekom trenutku korišten kao septička ili otpadna jama. Na samom dnu objekta, u sloju vlažne zemlje smeđe boje (SJ 89)[6] pronađeni su ostaci pet čitavih srednjovjekovnih keramičkih posuda koje su u svojoj zapuni sadržavale organske uzorke. Isto tako, pronađena je i veća količina razasutih organskih uzoraka. S obzirom da su spomenuti nalazi pronađeni na kontaktu sloja zapune i sterilne zemlje moguće je pretpostaviti da je riječ o nalazima iz najstarije dokumentirane faze objekta. S obzirom na arheološki kontekst i nalaze moguće je pretpostaviti da je istraženi objekt izvorno imao ulogu podzemnog skladišta/smočnice.

Iz objekta su uzeta dva uzorka drveta (UBA-45167, UBA-45169)[7] koji su radiokarbonskom metodom datirani u posljednju četvrtinu 13. stoljeća. S obzirom da su uzorci uzeti s drvenih dasaka iz oplate objekta, prilikom interpretiranja podataka svakako treba uzeti u obzir tzv. *old wood effect* odnosno mogućnost šireg raspona datacija ovisno o trenutku rušenja drveta, sekundarnoj uporabi i dužem razdoblju uporabe objekta. Treći uzorak (UBA-48654)[8] poslan na radiokarbonsko datiranje bio je uzorak sjemenke iz zapune lonca (PN 60) koji je datiran u sredinu 14. stoljeća. Na temelju arheološkog konteksta i prikupljenih podataka, uz određeni oprez, nalaze iz istraženog objekta moguće je datirati u razdoblje kraja 13. i prve polovice 14. stoljeća.

ARHEOBOTANIČKA ANALIZA

Materijali i metode

Na Botanički zavod Prirodoslovno-matematičkog fakulteta Sveučilišta u Zagrebu doneseno je osam vrećica uzoraka prikupljenih iz zapune objekta na arheobotaničku analizu. Uzorci su prethodno prosijani i flotirani[9] i sadržavali su is-

6 Zbog otežanih uvjeta istraživanja uslijed istjecanja fekalija iz aktivnog kanalizacijskog sustava predmetni sloj bilo je moguće identificirati tek u jugozapadnom dijelu objekta.

7 Analiza radiokarbonskog datiranja provedena je u ^{14}Chrono Centre, Queen's University Belfast. Srednja vrijednost dobivena metodom radiokarbonskog datiranja za uzorak UBA-45167 iznosi AD 1273 a za uzorak UBA-45169 AD 1293 (Sekulić 2022: Prilog 8.2.)

8 Srednja vrijednost dobivena metodom radiokarbonskog datiranja za uzorak UBA-48654 iznosi AD 1349.

9 Prikupljeni uzorci prosijavani su i flotirani na Odjelu za kopnenu arheologiju Službe za arheološku baštinu Hrvatskog konzervatorskog zavoda. Prilikom procesa korišteno je sito gustoće mrežice 0,5 mm. Uzorci U048, U049, U050, U052 i U054 činili su kompletnu zapunu sačuvanih keramičkih posuda (PN 058, 064, 057, 055, 060), uzorak U043 prikupljen je izravno tijekom istraživanja dok su uzorci U051 i U055 prikupljeni iz zemlje prikupljene tijekom istraživanja u jugozapadnom, stratigrafski najjasnijem, dijelu objekta. Riječ je o dvije vrećice zapremnine 5 kg svaka, koje je bilo moguće prikupiti s obzirom na otežane uvijete istraživanja. Na temelju prikupljenih podataka nije moguće donositi zaključke jesu li se predmetni uzorci izvorno čuvali u keramičkim posudama pa su s

ARCHAEOBOTANICAL ANALYSIS

Materials and methods

Eight bags of samples collected from the fill of the structure were brought to the Division of Botany of the Faculty of Science, University of Zagreb for archaeobotanical analysis. The samples were previously sieved and floated,[9] so they contained only plant remains without surrounding sediment. The archaeobotanical analysis included the isolation and identification of plant macrofossils.

Plant atlases (Cappers et al. 2006; Cappers, Neef 2012) as well as a comparative recent carpological collection from the Division of Botany in Zagreb were used for plant identification. Due to the relatively large number of *Prunus* fruitstones, which are often difficult to distinguish from each other based solely on their morphological characteristics, literature that clarifies the anatomical structure of the seeds and ecology of *Prunus* species was also used (Nielsen, Olrik 2001; Popescu, Caudullo 2016; Kosina, Marek 2021). The nomenclature of plant finds was harmonized with the Flora Croatica Database (Nikolić 2022).

After identification, all finds were classified into one of three ecological-ethnobotanical groups (Edible woody plants, Edible herbaceous plants, Natural vegetation) using Renfrew (1973). The group of edible woody and edible herbaceous plants included species that were (most likely) cultivated as well as those collected from the wild, as it is impossible to determine for some species whether they were cultivated or collected from the wild. The Natural vegetation group included species that grow wild in the Zagreb area but are not used for food by people. Based on this categorization, it will be possible to draw conclusions about the way the investigated medieval structure was used, as well as the diversity of plant species used in the diet of Zagreb's inhabitants at the time.

Plant finds were also grouped into those fo-

9 Collected samples were sieved and floated at the Department for Terrestrial Archaeology of the Croatian Conservation Institute's Service for Archaeological Heritage. During the process, a sieve with a mesh density of 0.5 mm was used. Samples U048, U049, U050, U052, and U054 made up the complete fill of preserved ceramic vessels (SF 058, 064, 057, 055, 060), sample U043 was collected directly during the research, and samples U051 and U055 were collected from soil gathered during research in the southwestern, stratigraphically clearest, part of the structure. These are two bags of 5 kg each, which could be collected considering the challenging research conditions. Based on the collected data, it is not possible to conclude whether these particular samples were originally kept in ceramic vessels and eventually ended up outside them, or whether they were stored in containers made of organic material (wood, textile, twine) that were not preserved.

ključivo biljne ostatke bez okolnog sedimenta. Arheobotanička analiza je uključivala izolaciju i identifikaciju pristiglih biljnih makrofosila.

Za determinaciju su korišteni biljni atlasi (Cappers et al. 2006; Cappers, Neef 2012), kao i komparativna recentna karpološka zbirka Botaničkog zavoda u nastajanju. Zbog relativno velikog broja koštica roda *Prunus*, koje se često međusobno teško pouzdano razlikuju samo na osnovu morfoloških karakteristika, dodatno je korištena literatura koja razjašnjava anatomsku građu sjemenki i ekologiju vrsta tog roda (Nielsen, Olrik 2001; Popescu, Caudullo 2016; Kosina, Marek 2021). Nomenklatura biljnih nalaza je usklađena prema Flora Croatica Database (Nikolić 2022).

Nakon identifikacije, svi su nalazi svrstani u jednu od tri ekološko-etnobotaničke skupine (Jestive drvenaste biljke, Jestive zeljaste biljke, Prirodna vegetacija) uz pomoć Renfrew (1973). U skupinu jestivih drvenastih i jestivih zeljastih biljaka zajedno su stavljene vrste koje su (najvjerojatnije) uzgajane, kao i one koje su sakupljane iz prirode, jer je za neke vrste nemoguće biti siguran radi li se o kultiviranim ili u prirodi sakupljanim primjercima. Skupini Prirodna vegetacija pridružene su vrste koje kao samonikle rastu na zagrebačkom prostoru, a ljudi ih ne koriste u prehrani. Na osnovu ove podjele bit će moguće donijeti zaključke o načinu korištenja istraživanog srednjovjekovnog objekta, kao i o raznovrsnosti biljnih svojti korištenih u prehrani tadašnjeg stanovništva Zagreba.

Biljne nalaze smo također grupirali u one koji su nađeni u posudama (5 uzoraka) i one koji su sakupljeni u okolnom sedimentu (3 uzorka). Nalazi nađeni u posudama, pomoći će nam da rekonstruiramo moguće načine konzumacije i kulinarske pripreme vrsta koje su bile pohranjene zajedno u istim posudama (sl. 4).

REZULTATI I RASPRAVA

Iz osam analiziranih uzoraka izolirana su ukupno 1464 biljna nalaza, od kojih je samo šest bilo karbonizirano (tab. 1). Kod nekih je nekarboniziranih ostataka uočena mineralizacija, no s obzirom na to da je na brojnim ostacima mineralizacija bila samo djelomična i često upitna, nisu posebno pobrojavani (polu)mineralizirani makrofosili. Većina izoliranih ostataka bila je dobro očuvana pa je samo 1,98 % ostataka ostalo nedeterminirano.

Najbrojniji su nalazi vinove loze (*Vitis vinifera*, 916 nalaza, sl. 5a), trešnje/višnje (*Prunus avium/*

vremenom završili izvan njih ili su bili čuvani u posudama izrađenim od organskog materijala (drvo, tekstil, uže) koje nisu ostale sačuvane.

Fig. 4 — Medieval vessel (SF 064) from the fill of the excavated structure (photo by: Lj. Gamulin)
Sl. 4 — Srednjovjekovni lonac (PN 064) iz zapune istraženog objekta (snimio: Lj. Gamulin)

und in ceramic vessels (5 samples) and those collected from the surrounding sediment (3 samples). Finds from vessels will help us reconstruct possible ways of consuming and culinary preparations of plants (or food) stored together in the same vessels (Fig. 4).

RESULTS AND DISCUSSION

A total of 1464 plant remains were isolated from the eight analyzed samples, of which only six remains were carbonized (Tab. 1). Mineralization was observed in some non-carbonized remains, but since mineralization was only partial and often questionable on numerous remains, semi-mineralized macrofossils were not separately counted. The majority of isolated remains were well preserved, with only 1.98% remaining indeterminated.

The most numerous finds were grapevine (*Vitis vinifera*, 916 remains, Fig. 5a), sweet/

cerasus, 260 nalaza, sl. 5b) i trnjine (*Prunus spinosa*, 122 nalaza).

Ukupno je determinirano 11 vrsta, jedan je nalaz determiniran do nivoa roda (*Ranunculus* sp.), a jedan do nivoa porodice (Apiaceae). Pet je svojti u tab. 1 prikazano na način da su ostaci identificirani kao mogući predstavnici dvije različite vrste, tj. roda. Takvi su nalazi označeni na način da su napisane obje moguće vrste, tj. roda kojima bi nalazi mogli pripadati te su ti nazivi međusobno odvojeni kosom crtom (/); *Malus/Pyrus*, *Prunus avium/cerasus*, *Prunus cerasifera/domestica* s. l. (sl. 6), *Triticum aestivum/durum* i *Vitis vinifera/Vitis vinifera* ssp. *sylvestris*. U nabrojanim slučajevima nije bilo moguće na osnovu izgleda pronađenih sjemenki sa sigurnošću odrediti o kojoj se točno vrsti radi. No, kako se u svim slučajevima obje vrste ili roda konzumiraju na isti način, determinacija do ovog stupnja bit će također vrlo korisna za rekonstrukciju prehrambenih navika stanovnika srednjovjekovnog zagrebačkog Gradeca.

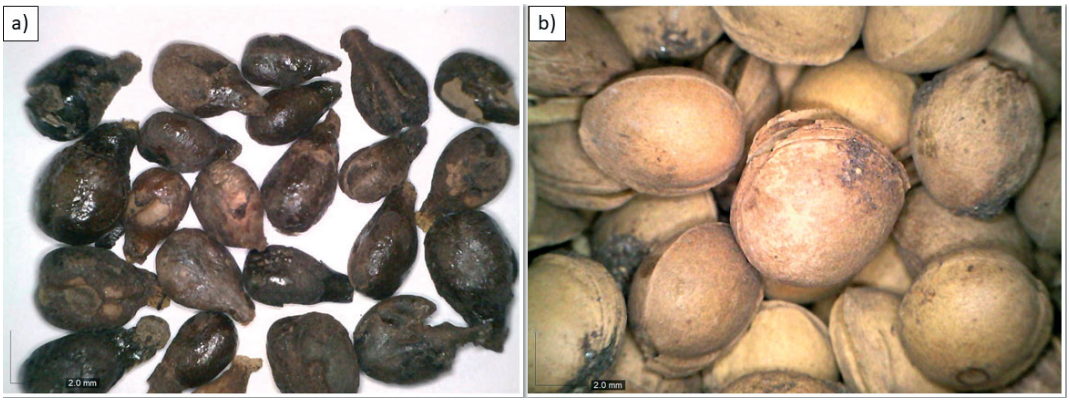

Fig. 5 — Seeds of a) grapevine (*Vitis vinifera*) and b) sweet/sour cherries (*Prunus avium/cerasus*) (photo by: S. Essert)
Sl. 5 — Sjemenke a) vinove loze (*Vitis vinifera*) i b) trešnje/višnje (*Prunus avium/cerasus*) (snimila: S. Essert)

Scientific name / Latinsko ime	English name	Hrvatsko ime	K / NK	MF structure / vrsta MF	PN 43	PN 048*	PN 049*	PN 050*	PN 051	PN 052*	PN 054*	PN 055	Total / Ukupno
Edible woody plants / Jestive drvenaste vrste													
Vitis vinifera L.	Grapevine	vinova loza	NK	Pip / sjemenka		114	182	44	495	71		10	**916**
Vitis vinifera L./*Vitis vinifera* L. ssp. *sylvestris* (C. C. Gmel.) Hegi	Grapevine / wild grapevine	vinova loza / lozika	NK	Pip / sjemenka							24		**24**
Prunus avium (L.) L./*cerasus* L.	Sweet / sour cherry	trešnja / višnja	NK	Fruitstone / koštica		12			248				**260**
Prunus spinosa L.	Blackthorn	trnjina	NK	Fruitstone / koštica			73		27	22			**122**
cf. *Prunus spinosa* L.	Blackthorn	trnjina	NK	Fruitstone / koštica			1	5					**6**
Rubus fruticosus L. agg.	Blackberry	kupina	NK	Seed / koštica			5		19	2			**26**
Malus/Pyrus	Apple/pear	jabuka / kruška	NK	Seed / sjemenka		1	2	3	9	4	5		**24**
Prunus cerasifera Ehrh./*domestica* s. l	Cherry plum / plum	trešnjolika šljiva / obična šljiva	NK	Fruitstone / koštica			1		7				**8**
Prunus cf. *cerasifera* Ehrh./*domestica* s. l	Cherry plum / plum	trešnjolika šljiva / obična šljiva	NK	Fruitstone, fr. / koštica, fr.			5						**5**
Prunus cf. *cerasifera* Ehrh./*domestica* s. l	Cherry plum / plum	trešnjolika šljiva / obična šljiva	NK	Fruitstone / koštica			2						**2**
Cornus mas L.	Cornelian cherry	crveni drijen	NK	Fruitstone / koštica			2		2				**4**
Corylus avellana L.	European hazelnut	obična lijeska	NK	Nut shell fr. / orah, fr.					1				**1**
Juglans regia L.	Walnut	obični orah	K	Nut shell fr. / orah, fr.	1								**1**
Prunus persica (L.) Batsch	Peach	breskva	NK	Fruitstone / koštica						1			**1**
Edible herbaceous plants / Jestive zeljaste vrste													
Cucumis sativus L.	Cucumber	krastavac	NK	Seed / sjemenka					12			1	**13**
Foeniculum vulgare Mill.	Fennel	obični komorač	NK	Mericarp / merikarp					13				**13**
Panicum miliaceum L.	Millet	divlji proso	K	Grain / pšeno		2		2					**4**
Triticum aestivum L./*durum* Desf.	Common wheat	obična pšenica	K	Grain / pšeno					1				**1**
Natural vegetation / Prirodna vegetacija													
Carpinus betulus L.	Hornbeam	obični grab	NK	Seed / sjemenka					2				**2**
Apiaceae	Umbellifers	štitarke	NK	Mericarp / merikarp			1						**1**
Cf. *Ranunculus* sp.	Buttercup	žabnjak	NK	Nutlet / plod					1				**1**
Indet.			**NK**	**-**		**12**		**16**	**1**				**29**
Total / Ukupno					**1**	**141**	**274**	**70**	**838**	**100**	**29**	**11**	**1464**

Tab. 1 — The list of taxa found on archaeological site Banski dvori (Zagreb) (MF – macrofossil, K – carbonised, NK – not carbonised, Indet. – indeterminate, * – sample from the vessel, fr. – fragment) (made by: S. Essert)

Tab. 1 — Popis determiniranih biljnih svojti s lokaliteta Banski dvori (Zagreb) (MF – makrofosil, K – karbonizirani, NK – nekarbonizirani, Indet. – nedeterminirano, * – uzorak iz posude, fr. – fragment) (izradila: S. Essert)

sour cherries (*Prunus avium/cerasus*, 260 remains, Fig. 5b), and blackthorn (*Prunus spinosa*, 122 remains).

A total of 11 species were identified, one find was determined to the level of genus (*Ranunculus* sp.), and one to the level of family (Apiaceae). In Tab. 1, five taxa are presented as possible representatives of two different species or genera. These findings are indicated by writing both possible species or genera to which the remains could belong, with the names separated by a forward slash (/); *Malus/Pyrus*, *Prunus avium/cerasus*, *Prunus cerasifera/domestica* s. l. (Fig. 6), *Triticum aestivum/durum*, and *Vitis vinifera/Vitis vinifera* ssp. *sylvestris*. In these cases, it was not possible to determine with certainty which exact species the found seeds belonged to, based on their appearance. However, since both species or genera were consumed in the same way in all cases, determination to this degree will also be very useful for reconstructing the dietary habits of the inhabitants of medieval Gradec.

The results of the ecological-ethnobotanical classification show that only four of the found plant remains belong to non-edible taxa (Fig. 7). The majority of plant remains, up to 95.63%, belong to the category of edible woody plants. In addition to the already mentioned grapevine, sweet/sour cherries, and blackthorn, it is worth mentioning the relatively numerous findings of blackberries (*Rubus fruticosus* agg, 26 remains) and apples/pears (*Malus/Pyrus*, 24 remains).

Some of the found woody species, such as grapevine and peach, were certainly cultivated, while the others, such as Cornelian cherry and blackthorn, show that the population supplemented their diet by gathering and consuming fruits from nature. Plum stones were also found, but based only on their morphology, it is not possible to know whether they belonged to cultivated varieties (*P. domestica* s. l.) or wild ones (*P. cerasifera*), so they were referred to as *Prunus cerasifera/domestica* s. l. (Fig. 6).

All the identified species grow in the continental part of Croatia, so there is no evidence that the structure stored food imported from distant regions and other countries.

In the medieval period, fruit was consumed fresh or in the form of fruit products such as juices, concentrates, syrups, jams, jellies, compotes, candied and dried fruit (Renfrew 1973). Given the seasonality in an area with a moderately warm humid climate with warm summers (Cfb climate type according to Köppen's climate types), and

Fig. 6 — Blackthorn (*Prunus spinosa*) fruitstone (left) and two cherry plum/plum (*Prunus cerasifera/domestica* s. l.) fruitstones (right) (photo by: S. Essert)
Sl. 6 — Koštica vrste *Prunus spinosa* (lijevo) i dvije koštice vrste *Prunus cerasifera/domestica* s. l. (desno) (snimila: S. Essert)

Rezultati ekološko-etnobotaničke klasifikacije pokazuju da su samo četiri pronađena biljna ostatka pripadnici svojti koje nisu jestive (sl. 7). Najveći broj biljnih ostataka, njih čak 95,63 % spada u kategoriju jestivih drvenastih biljaka. Osim već spomenute vinove loze, trešanja/višanja i trnjine, treba od voća spomenuti još i relativno brojne nalaze kupine (*Rubus fruticosus* agg, 26 nalaza) i jabuke/kruške (*Malus/Pyrus*, 24 nalaza).

Neke pronađene drvenaste vrste, poput vinove loze i breskve su zasigurno bile kultivirane, a neke, poput drijena i trnjine pokazuju da je stanovništvo dopunjavalo prehranu sakupljajući i konzumirajući plodove iz prirode. Pronađene su i koštice šljiva, ali samo na temelju njihove morfologije nije moguće znati radi li se o plodovima kultiviranih svojti (*P. domestica* s. l.) ili pak onih sakupljenih iz prirode (*P. cerasifera*) pa smo ih nazivali *Prunus cerasifera/domestica* s. l. (sl. 6).

Sve pronađene svojte rastu u području kontinentalne Hrvatske pa ne postoji dokaz da su se u istraženom objektu čuvale namirnice koje su dopremljene iz udaljenih krajeva i drugih zemalja.

U srednjovjekovnom razdoblju voće se konzumiralo svježe ili u obliku voćnih prerađevina poput sokova, koncentrata, sirupa, marmelada, želea, kompota, kandiranog i sušenog voća (Renfrew 1973). S obzirom na sezonalnost zagrebačke umjereno vlažne tople klime (Cfb kli-

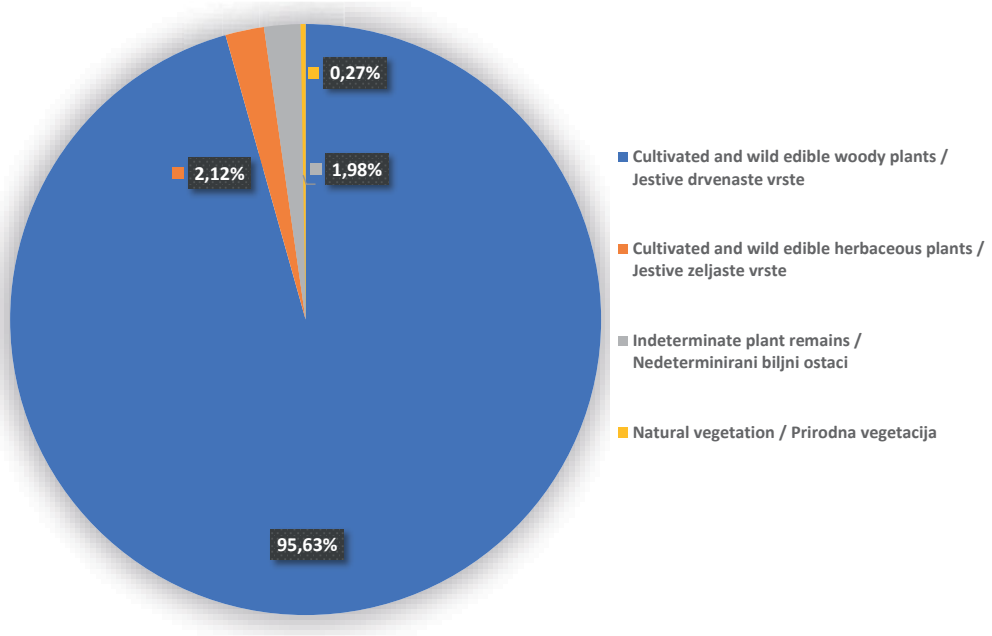

Fig. 7 — Percentage of ecological-ethnbothanical groups at the site according to the total number of isolated plant remains (made by: S. Essert)
Sl. 7 — Postotak ekološko-etnobotaničkih skupina na lokalitetu prema ukupnom broju izoliranih biljnih nalaza (izradila: S. Essert)

the limited technical possibilities for storing fresh fruit in medieval times, different methods of preservation were common. Fruits such as apples, pears, and quinces were dried to extend their shelf life and were used as a supplement to the diet in winter (Pearsall 2000). Wealthier inhabitants of medieval Europe preserved fruit in honey and later in sugar (Varga 2015: 223). Wine, wine vinegar, and citrus fruit juices from lemons, oranges, or unripe grapes played an important role in medieval cuisine and were added to dishes, often in combination with breadcrumbs, liver, almond milk, and eggs to prepare various sauces (Stingl 2018: 65). Verjuice[10] was a sour juice made from unripe grapes with apples and other unripe fruit that was a common addition to medieval dishes and was available throughout the year (Weiss Adamson 2004: 29). It is exceptionally interesting that plant samples collected by flotation of the fill of five ceramic vessels (PN 055, 057, 058, 060, 064) indicate the possibility that the vessels contained aforementioned verjuice. Indeed, in all five vessels, remains of grape seeds and apple/pear seeds were found, while different fruits (cherry/sour cherry, blackberry, blackthorn, plum, peach, Cornelian cherry) were found in one or more of them. The recurrence of grape and apple/pear remains in combination

ma prema Köppenovoj klasifikaciji) te na ograničene tehničke mogućnosti čuvanja svježeg voća u srednjovjekovnom razdoblju, uobičajeni su bili različiti načini konzerviranja. Voće poput jabuke, kruške i dunje bilo je sušeno kako bi im se produžio rok trajanja te su korištene kao dopuna prehrani u zimskom periodu (Pearsall 2000). Bogatiji stanovnici srednjovjekovne Europe voće su konzervirali u medu te kasnije u šećeru (Varga 2015: 223). U srednjovjekovnoj kuhinji važnu ulogu imali su vino, vinski ocat i voćni sokovi od limuna, naranče ili nezrelog grožđa koji su dodavani jelima te u kombinaciji s krušnim mrvicama, jetrom, bademovim mlijekom i jajima korišteni za pripremu različitih umaka (Stingl 2018: 65). *Verjuice*[10] (eng.), bio je kiseli sok od nedozrelog grožđa s jabukama i ostalim nezrelim voćem koji je bio uobičajeni dodatak srednjovjekovnim jelima dostupan čitave godine (Weiss Adamson 2004: 29). Iznimno je zanimljivo da biljni uzorci prikupljeni flotacijom zapune pet keramičkih posuda (PN 055, 057, 058, 060, 064) svojim sastavom upućuju na mogućnost da se u posudama čuvao upravo ranije spomenuti kiseli sok (*verjuice*). Naime, u svih pet posuda pronađeni su ostaci sjemenki vinove loze i sjemenki jabuka/krušaka, dok je ostalo različito voće (trešnja/višnja, kupina, trnjina, šljiva,

10 ***agrestum*** (lat.), ***agraz*** (španj.), ***agràs*** (katal.), ***verjus*** (fra.), ***agresto*** (tal.)

10 *agrestum* (lat.), *agraz* (španj.), *agràs* (katal.), verjus (fra.), agresto (tal.)

with different fruits in all analyzed ceramic vessels suggests the possibility that these are traces of verjuice. An additional argument for this claim is the interpretation of the investigated structure as an underground storage or pantry.

A group of herbaceous edible plants confirms the consumption of cereals (wheat, *Triticum aestivum/durum* and millet, *Panicum miliaceum*), vegetables (cucumber, *Cucumis sativus*), and spices (fennel, *Foeniculum vulgare*). For fennel, it is uncertain whether it was gathered from the wild or cultivated, while the other herbaceous species represent cultivated varieties. The few findings of carbonized millet in pots were probably accidentally introduced there, as there is no evidence in the literature that millet was used in the production of verjuice.

On the medieval sites explored so far in Croatia, cereal remains predominated, and the remains of edible woody species were much rarer (Reed et al. 2021: 347–361).

From Tab. 2, it is evident that only grapevine finds are represented on over 45% of the sites, while hazelnut (*Corylus* sp.), elderberry (*Sambucus ebulus*), strawberry (*Fragaria* sp.), and blackberry/raspberry (*Rubus fruticosus/idaeus*) remains were found on at least 20% of the sites. The existence of vineyards in the continental part of Croatia in the medieval period is recorded in numerous documents (Ljubljanović 2006: 259–300), so the frequency of grapevine seeds in the samples is not surprising.

For the first time on a medieval site in Croatia, the remains of blackthorn and (possibly even cultivated) plums were recorded.

In spite of the relatively rare findings of fruit, it should by no means be concluded that fruit from woody plants was not regularly consumed by the medieval population. It is believed that the reason for the sporadic and less frequent appearance of fruit and nuts in archaeobotanical samples is that fruit is harder to preserve over a longer period of time due to taphonomic factors and preservation potential. It has been observed that carbonized fruit remains, which are most typically found in dry sediments, are much rarer than those found in waterlogged conditions (Antolín, Jacomet 2015: 19–33). Fruit from woody plants is mainly consumed in its raw form, so carbonization (except in the case of, for example, a fire) is a relatively rare occurrence, while anoxic marine/lake sediments can preserve non-carbonized carpological remains. This is precisely why it is possible that the findings of fruit and nuts from continental sites

breskva, drijen) pronađeno u jednoj ili više njih. Upravo ponavljanje uzorka ostataka grožđa i jabuke/kruške u kombinaciji s različitim voćem u svim analiziranim keramičkim posudama, sugerira mogućnost da je riječ o tragovima verjuicea. Dodatni argument za ovu tvrdnju predstavlja interpretacija istraženog objekta kao podzemnog skladišta, odnosno smočnice.

Skupina zeljastih jestivih biljaka potvrđuje konzumaciju žitarica (pšenica, *Triticum aestivum/durum* i proso, *Panicum miliaceum*), povrća (krastavac, *Cucumis sativus*) i začinskog bilja (komorač, *Foeniculum vulgare*). Za komorač ne možemo biti sigurni je li sakupljan u prirodi ili uzgajan, a ostale zeljaste vrste predstavljaju uzgajane svojte. Malobrojni nalazi karboniziranog prosa u loncima vjerojatno su slučajno tamo dospjeli jer ne postoje dokazi u literaturi da se proso koristilo u izradi verjuicea.

Na do sada istraženim srednjovjekovnim lokalitetima u Hrvatskoj prevladavaju nalazi žitarica, a ostaci drvenastih korisnih vrsta bili su puno rjeđi (Reed et al. 2021: 347–361).

Iz tab. 2 je vidljivo da su od jestivih drvenastih vrsta samo nalazi vinove loze zastupljeni na preko 45 % nalazišta, a na minimalno 20 % lokaliteta pronađeni su još ostaci lijeske (*Corylus* sp.), bazge abdovine (*Sambucus ebulus*), jagode (*Fragaria* sp.) i kupine/maline (*Rubus fruticosus/idaeus*). U brojnim je dokumentima zabilježeno postojanje vinograda u srednjem vijeku na području kontinentalne Hrvatske (Ljubljanović 2006: 259–300) pa stoga ne čudi učestalost sjemenki vinove loze u uzorcima.

Po prvi su put na srednjovjekovnom lokalitetu u Hrvatskoj zabilježeni nalazi trnjine i (možda čak i uzgajane) šljive.

Međutim, bez obzira na relativno rijetke nalaze voća, nipošto se ne bi smjelo zaključiti da plodovi drvenastih vrsta nisu bili redovito korišteni u prehrani tadašnjeg stanovništva. Smatra se da je uzrok sporadičnog i manje brojnog pojavljivanja voća i orašastih plodova u arheobotaničkim uzorcima taj, što se voće zbog tafonomskih čimbenika i potencijala za prezervaciju teže sačuva kroz duži period. Primijećeno je naime da su karbonizirani ostaci voća, kakvi se tipično nalaze u suhim sedimentima, mnogo rjeđi od nalaza iz vodenih sedimenata (Antolín, Jacomet 2015: 19–33). Plodovi drvenastih vrsta konzumiraju se naime uglavnom u sirovom obliku pa je karbonizacija (osim u slučaju npr. požara) relativno rijetka pojava, dok se u anoksičnim morskim/jezerskim sedimentima mogu očuvati i

	Torčec	Vinkovci	Vrbovec	Torčec – Gradić	Nuštar	Virovotica Kiškorija	9 sites in Slavonia* / 9 lokaliteta u Slavoniji*	Total / ukupno MF	Percentage of sites (%) / postotak lokaliteta (%)
Vitis vinifera L.	2	1	3	2			36 (3)	44	47
Sambucus ebulus L.	6	2	40	24		2		74	33
Corylus sp.							18 (4)	18	27
Fragaria sp.	2	2					3 (1)	7	20
Rubus fruticosus agg.	1			1			1 (1)	3	20
Rubus fruticosus/idaeus							8 (1)	8	20
Cornus mas L.							3 (2)	3	13
Rubus idaeus L.							1 (1)	1	7
Malus/Pyrus							3 (1)	3	7
Olea sp., wild / divlja							1 (1)	1	7
Physalis alkekengi L.							3 (1)	3	7
Prunus avium (L.) L.							2 (1)	2	7
Prunus persica (L.) Batsch				3				3	7
Quercus sp.							1 (1)	1	7
Rosa sp.							4 (1)	4	7
Sambucus nigra L.				1				1	7
LITERATURE / LITERATURA:	Šoštarić 2004: 107–115	Sekelj Ivančan, Tkalčec 2006: 141–212	Šoštarić, Šegota 2010a: 247–253	Šoštarić, Šegota 2010b: 373–388	Papeša et al. 2015: 261–288	Šoštarić 2015: 311–327)	Reed et al. 2021: 347–361		

Tab 2 — The number of findings of edible woody species from medieval sites in Croatia so far (* – the number of sites where each species was found is shown in parentheses, MF – macrofossil) (made by: S. Essert)

Tab. 2 — Prikaz brojnosti dosadašnjih nalaza jestivih drvenastih vrsta sa srednjovjekovnih lokaliteta u Hrvatskoj (* – broj lokaliteta na kojima je pojedina vrsta nađena prikazan je u zagradi, MF – makrofosil) (izradila: S. Essert)

may be less frequently recorded than their actual occurrence. Additionally, cereals and legumes are of smaller volume, so a greater number of grains/seeds could be stored in the same place (in a bag, dwelling, storage facility, etc.), and due to their large number, there is a greater chance that some of the remains will be preserved for hundreds/thousands of years.

CONCLUSION

Based on all the collected data, the investigated underground structure can be cautiously interpreted as a remnant of a residential or accompanying building of a medieval house in the peak period of medieval Gradec. The large amount of seeds found in the fill of the five ceramic vessels indicates the possibility that they contained the contents of a cellar pantry, possibly of a medieval urban house. The mentioned interpretation does not exclude the possibility that the structure was secondarily, as is common in the medieval period of urban life, used for waste disposal.

The plant samples collected by flotation of the fill of the five ceramic vessels suggest the possibility that they contained verjuice, the acidic juice made from unripe grapes and other unripe fruits, which was a common addition to medieval dishes. In fact, remains of grape and apple/pear seeds were found in all five vessels, and other different fruits (cherry/sour cherry, blackberry, blackthorn, plum, peach, Cornelian cherry) were found in one or more pots. Other samples collected during the excavation of the structure (walnut, cucumber, hornbeam, blackthorn, hazelnut, fennel, apple, cherry/sour cherry, plum, blackberry, raspberry, wheat, grapevine) represent the usual food items of medieval diet.

The findings processed in this paper provide an insight into the dietary habits of the medieval population of Zagreb's Gradec during the 13th and 14th centuries and can be considered as a valuable contribution to the archaeobotany of the medieval period.

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nekarbonizirani karpološki ostaci. Upravo stoga je moguće da nalazi voća i orašastih plodova s kontinentalnih lokaliteta budu rjeđe registrirani, nego je bila njihova realna pojavnost. Osim toga, žitarice i mahunarke manjeg su volumena pa je uvijek veći broj pšena/sjemenki pohranjivan na istom mjestu (u vreći, nastambi, spremištu i sl.) te je zbog te velike brojnosti i veća šansa da se neki od ostataka sačuvaju stotinama/tisućama godina.

ZAKLJUČAK

Na temelju svih prikupljenih podataka, istraženi podzemni objekt moguće je uz određeni oprez interpretirati kao ostatak stambenog ili popratnog objekta gradske kuće iz doba procvata srednjovjekovnog Gradeca. Velika količina sjemenki pronađena u zapuni pet lonaca ukazuje na mogućnost da je riječ o sadržaju podrumske smočnice uz ili u sklopu srednjovjekovne gradske kuće. Spomenuta interpretacija ne isključuje mogućnost da je objekt sekundarno, uobičajeno za srednjovjekovno razdoblje gradskog života, korišten za odbacivanje otpada.

Biljni uzorci prikupljeni flotacijom zapune pet keramičkih lonaca svojim sastavom upućuju na mogućnost da se u njima čuvao kiseli sok od nedozrelog grožđa s nezrelim voćem (*verjuice*) koji je bio uobičajeni dodatak srednjovjekovnim jelima. Naime, u svih pet posuda pronađeni su ostaci sjemenki vinove loze i sjemenki jabuka/krušaka, a ostalo različito voće (trešnja/višnja, kupina, trnjina, šljiva, breskva, drijen) pronađeno je u jednoj ili više posuda. Ostali uzorci prikupljeni tijekom istraživanja objekta (orah, krastavac, grab, drijen, ljeska, komorač, jabuka, trešnja/višnja, šljiva, kupina, malina, pšenica, vinova loza) predstavljaju uobičajene namirnice srednjovjekovne prehrane.

Nalazi obrađeni u ovome radu pružaju uvid u prehrambene navike srednjovjekovnog stanovništva zagrebačkog Gradeca tijekom 13. i 14. stoljeća te se mogu smatrati vrijednim doprinosom arheobotanici srednjovjekovnog razdoblja.

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