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Peaches at Medieval Site Ras, Serbia: Unraveling Routes of Introduction and Local Cultivation in the Balkans

Abstract. The study combines archaeological evidence, written sources, and genetic studies to trace the routes of peach introduction to the Balkans and explore the local cultivation practices and it revisits the discovery of peach remains at the medieval site of Ras in southwest Serbia. Peach (*Prunus persica* [L.] Batsch) came to the Mediterranean from the East around the 6th/4th c. BC, and over the following centuries it spread westwards. In the Roman Empire it was an already well known fruit. One possible route for its introduction to Europe was through the Balkans ("via Balcani"), from the Black Sea region along the Danube River to other areas. However, following the Migration Period and the fall of the Western Roman Empire, the peach tree orchards remained mostly abandoned for the next three centuries. In contrast, the peach trees in the Eastern (Byzantine) Empire remained present despite repeated invasions, and destructive conflicts, which occurred between the 5th–11th/12th centuries. Peaches were generally available on the market and described in written sources. Archaeological evidence of the of peaches in the region can be found at the medieval site Ras in Serbia, where peach fruit stone fragments have been radiocarbon dated to 1021–1158 cal AD. During the 12th century, Ras served as a Byzantine fortress and later became the main defensive stronghold of the newly formed Serbian state from the middle of the 12th century to the fourth decade of the 13th century. Given the peach fruit soft texture and difficulty to transport, it is likely that they were grown locally. The Romans could have introduced peaches into the area during the 4th century. However, the area was abandoned between the 6th–9th centuries and the peach trees could not have survived if unattended. In the Balkans, including present-day Serbia, there is a significant genetic diversity of peach landraces that are grown effectively wild in vineyards ("vineyard peach") and are ancient in origins. The presence of peach stones at Ras suggests a possible continuity of practices linked to the "via Balcani" route and enduring local cultivation or trade from southern regions since ancient times. Future discoveries of peach stones in the area will enhance our

understanding of this historical route. This study provides significant insights into the prolonged existence and local cultivation of peaches in the broader region, emphasizing the interplay between cultural exchange, trade, and agricultural practices over millennia.

Keywords: Peach (*Prunus persica* [L.] Batsch), medieval site Ras, Serbia, Byzantine Empire, vineyard peach, genetic diversity

Introduction

In this interdisciplinary study, we revisit the finds of peaches (*Prunus persica* [L.] Batsch) from the medieval site of Ras. We examine the possible routes of the arrival of peaches to the site of Ras and the Balkans, using multiple lines of evidence from archaeological records, written sources, and genetic studies of local peach landraces that have been grown wild in vineyards ("vineyard peach") since antiquity.

The site of Ras is located in southwest Serbia, 11 km southwest of the city of Novi Pazar, in the center of what was the medieval Serbian state (Fig. 1). The fortress of Ras stands atop Gradina Hill (750 m asl), overlooking the settlement of Podgradje below (620 m asl) near the confluence of the Sebečevska and Raška rivers[1] (Fig. 2). Together, they form the Complex of Ras, declared a UNESCO World Heritage site alongside nearby churches and monasteries[2].

The Ras complex exhibits various stages of occupation and development spanning from prehistory to the 13th century[3]. Evidence of a hill fort settlement dating back to the early Bronze Age and late Iron Age has been uncovered. Excavations at Podgradje reveal Roman occupation in the 3rd century AD. The initial fortress, from the 4th century, is situated at a limited area on the hill and the eastern part of the plateau. The fortress was abandoned in the end of the 6th century or beginning of the 7th century. The reconstruction of the fortress in the 9th and 10th centuries can be linked to Serbs and Bulgarians. The rebuilding of the fortress at the end of the 11th century and in the middle of the 12th century is attributed to the Byzantines. Towards the end of the third decade of the 12th century, the fortress was burnt and destroyed. Shortly after its destruction, the fortress was rebuilt in 1149 when the Byzantine emperor Manuel I Comnenus started a campaign against the Serbs. Soon after the campaign, the fortress of Ras became the main defensive stronghold in the central part of the newly formed Serbian state under the Nemanjić dynasty, which had to defend the ruler and his court from the second half of the 12th century. The fortress of Ras was abandoned after being destroyed in a fire in the 4th decade of the 13th century and was not rebuilt[4].

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1 M. Popović, *Tvrđava Ras*, Beograd 1999, *passim*.

2 Stari Ras has been declared a UNESCO World Heritage site together with a group of churches and monasteries in the vicinity. https://whc.unesco.org/en/list/96/ [21 XII 2023].

3 M. Popović, *Tvrđava Ras*…, *passim*.

4 *Ibidem*, *passim*.

Fig. 1. Map of the Byzantine Empire in 1265, indicating the location of Ras (adapted from The *Historical Atlas* by William R. Shepherd, 1911. Source: Wikipedia, File: ShepherdByzempire1265.jpg, Public domain).

The archaeological research, led by Marko Popović of the Archaeological Institute of Belgrade, uncovered buildings dating to the 12th and 13th centuries[5]. The plant samples were hand-collected where charred seeds were visible, from the hilltop fortress (Gradina) and the settlement below (Podgradje)[6]. The subsequent analysis and publication of plant remains from Ras revealed a predominant cultivation of bread wheat (*Triticum aestivum*) followed by rye (*Secale cereale*), barley (*Hordeum vulgare*) oats (*Avena sativa*), and millet (*Panicum miliaceum*) and accompanying weeds and ruderals. Noteworthy discoveries also included a piece of charred

[5] *Ibidem*, *passim*. Systematic archaeological investigations of the Ras complex were conducted by Marko Popović between 1977 and 1995. See Figs 3 and 4.

[6] The plant samples were manually picked from layers by archaeologists at Ras during the excavations between 1972 and 1984. No systematic recovery or flotation methods were employed, and the provenience information was recorded on the labels of the samples, which were provided to K. Borojević by M. Popović. The analyzed plant samples are stored at the National Museum of Serbia in Belgrade.

round bread, the contents of a pot comprising cereal porridge, and fragments of peach stones[7]. The finds of peaches are the subject of this article.

Fig. 2. Aerial view of the fortress of Ras – Gradina (photograph by I. Dimitrijevic, after M. Popović, *Tvrđava Ras*…).

Discoveries of peaches at Ras and dating

Fragments of only two peach stones (pits) were hand collected from the site of Ras, originating from two distinct areas (Fig. 3). One peach stone was discovered within the fortress located at the hilltop Gradina in the central-eastern part (Fig. 4). The other peach stone was collected from the medieval layer in the central part of Podgradje, below the fortress[8]. Both fruit stones were charred (Figs 5a and 5b), indicating their exposure to fire in ancient times.

[7] K. Borojević, *The Analysis of Plant Remains from the Fortress Ras – the 12th and the Beginning of the 13th Century*, Sta 52, 2002, p. 191–205; eadem, *Nutrition and Environment in Medieval Serbia: Charred Cereal, Weed and Fruit Remains from the Fortress of Ras*, VHA 14, 2005, p. 453–464.

[8] Visible charred peach stones were manually collected from excavation layers from at two distinct locations: 1) Fragments from one peach stone (0.80 g) were discovered within the layers at the for-

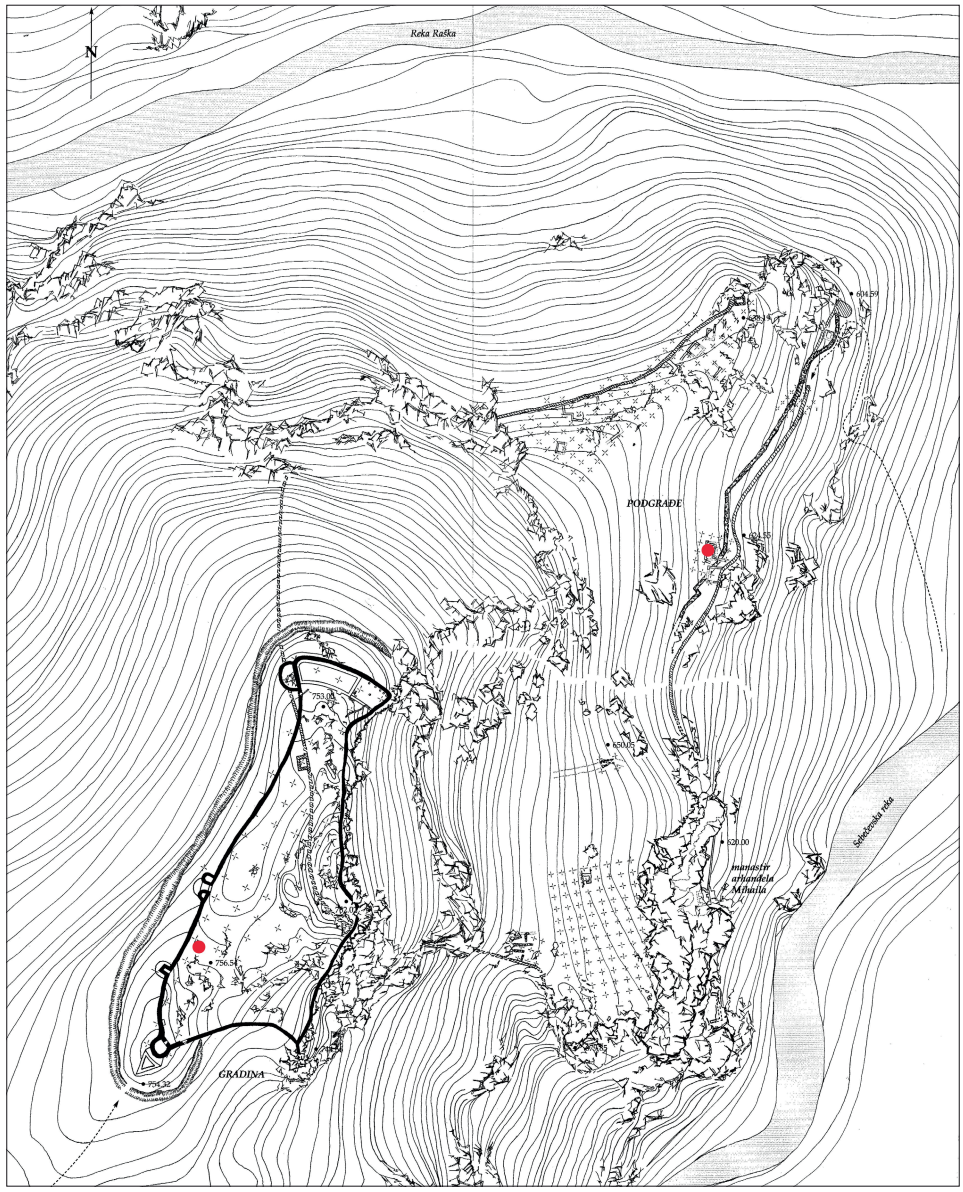

Fig. 3. Plan of the fortress of Ras (Gradina) and Podgradje below. The locations where peach finds were discovered are marked with dots. (Modified from "Situacioni plan Tvrdjave Ras (R = 1 : 1000)" in M. Popović, *Tvrđava Ras*…, Posebni prilozi).

tress situated at the hilltop Gradina (Kvadrant H/19-A, III/2 otkopni sloj), dating to the III-a Horizon; 2) Fragments of another peach stone (1.12 g) were found in the cultural layer in the central part of Podgradje, below the fortress (Ras-Podgradje; Centralni sector), dated to the Medieval layer.

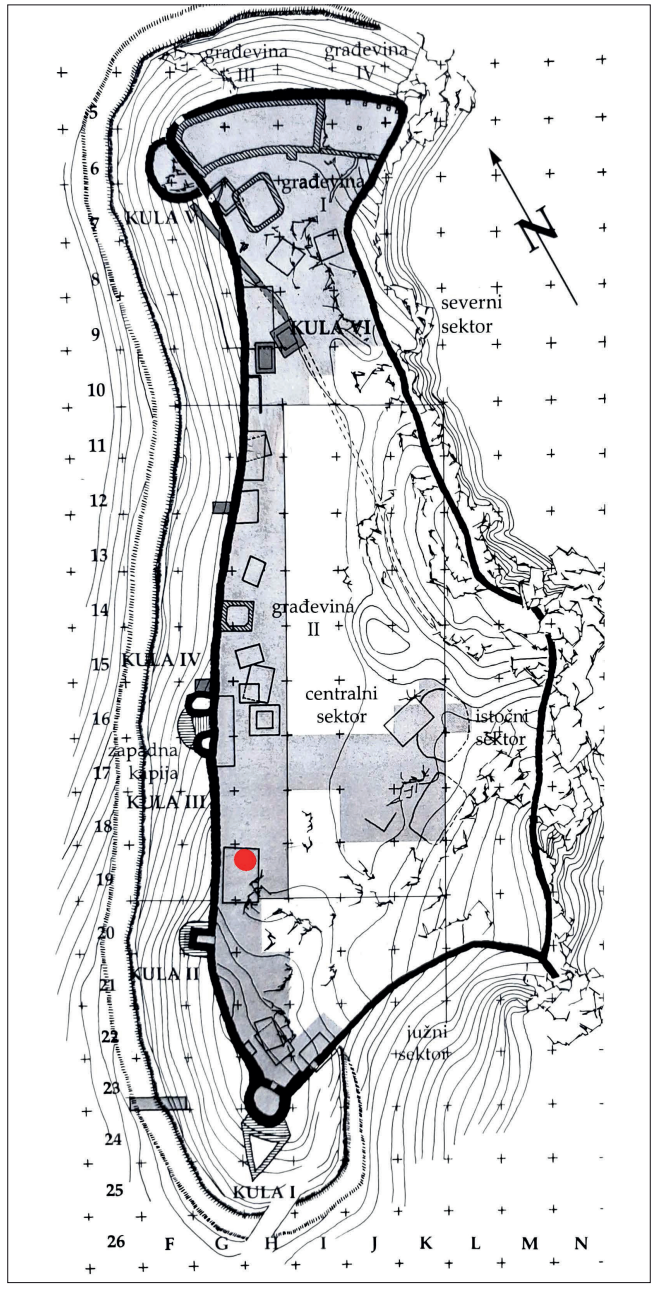

Fig. 4. Plan of the fortress (Gradina) showing the excavated area (shaded in grey) and the excavation grid (10 × 10 m squares). The location of the peach stone (submitted for radiocarbon dating) is indicated by a dot. (Modified from Figure 10, in M. Popović, *Tvrđava Ras*…, p. 50).

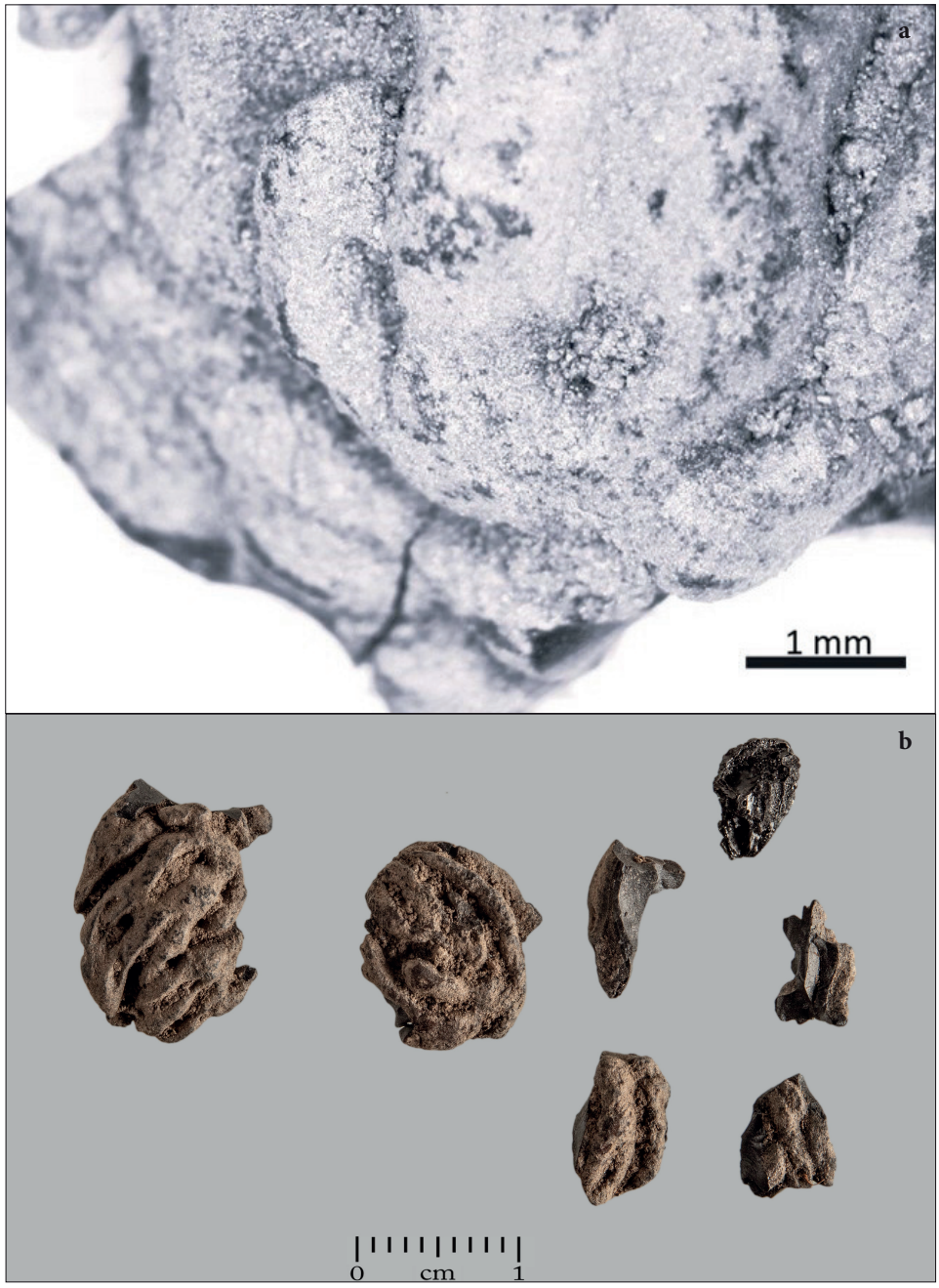

Fig. 5. Fragments of charred *Prunus persica* (peach) stones from Ras:
a) from Gradina, submitted for AMS dating (photograph by K. Borojević);
b) from Podgradje (photograph by M.M. Stojanović, National Museum, Belgrade).

The precise dating of the peach stones from Ras was not available at the time. The peach stone found from the fortress Gradina was discovered and collected from a layer associated with Building horizon III-a dated after AD 1130 until the mid-12th century[9], based on archaeological material and the coins minted during the rule of Manuel I Comnenus (1143/1180)[10]. Subsequently, fragments of the carbonized peach stones from Gradina (Fig. 5a) were submitted for AMS radiocarbon dating to confirm their age and establish their antiquity. The calibrated dates for the peach sample range between 1021 to 1158 cal AD (Fig. 6). The calibrated result of the sample indicated that the peach was growing somewhere between the early 11th and mid-12th century[11].

The archaeological dating of Horizon III and the radiocarbon dates for the peach are similar[12]. However, the direct radiocarbon dates suggest that the peach finds may be almost a century older than previously implied by the dating of Building Horizon III-a from the fortress, based on the archaeological material where the peach was found. If we accept the calibrated radiocarbon dates, the peach finds would correspond to Horizon II, dating from the early 11th to mid-12th century when Ras was a Byzantine fortress. Stratigraphic units from Horizon II show signs of conflagrations and are dated by the scyphate coin of Emperor John II Comnenus (1118–1143), marking the end of Horizon. The conflagration is associated with the destruction of the fortress. According to the Byzantine historian John Cinnamus[13], the Serbs participated in the invasions of Byzantine estates in 1127 and destroyed the fortress of Ras. The Serbs were ultimately defeated, and the Byzantines constructed a new fortress at Ras on the site where the old one was burned down. Numismatic finds, particularly those associated with John II Comnenus, provide additional dating evidence, indicating the return of the Romaic crew to the fortress. The archaeological evidence confirms this destruction event through the burning of the palisade fortification and the destruction of the rampart. It is possible that peach stones got charred during the conflagration associated with the destruction of the fortress of Ras in 1127[14].

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[9] At the fortress of Ras (Kvadrant H/19-A), where a peach fragment was found, House 44 was excavated (Horizon III-b), which was built over the western rampart from Horizon III-a (cf. M. Popović, *Tvrđava Ras*…, p. 197–199).

[10] V. Ivanišević, *Nalazi novca iz trdjave Ras*, [in:] M. Popović, *Tvrđava Ras*…, p. 417–424.

[11] The charred fragments of peach stones from Gradina, Ras (collected in 1977) were sent to Beta Analytic for AMS radiocarbon dating in 2017 (Beta-465302). The conventional radiocarbon age was determined to be 970 +/– 30 BP, which corresponds to a calibrated age of 1021 to 1158 cal AD (95.4% probability), INTCal20 calibration curve used. (See Fig. 6).

[12] The radiocarbon dating of the peach, ranging from 1021 to 1158 AD, does not rule out its association with Horizon III-a. Even if we consider the peach to belong to Building Horizon III-a, it is likely that the ruler and the court of the first Serbian state, who occupied the fortress at Ras, were already familiar with peaches in the region.

[13] *Ioannis Cinnami epitome*, I, 5, C, ed. A. Meineke, Bonnae 1836 [= *CSHB*].

[14] M. Popović, *Tvrđava Ras*…, p. 404; V. Ivanišević, *Nalazi novca*…, p. 417–424. For more recent finds of seals from Ras cf. V. Ivanišević, B. Krsmanović, *Byzantine Seals from the Ras Fortress*, ЗРВИ 50.1, 2013, p. 449–460.

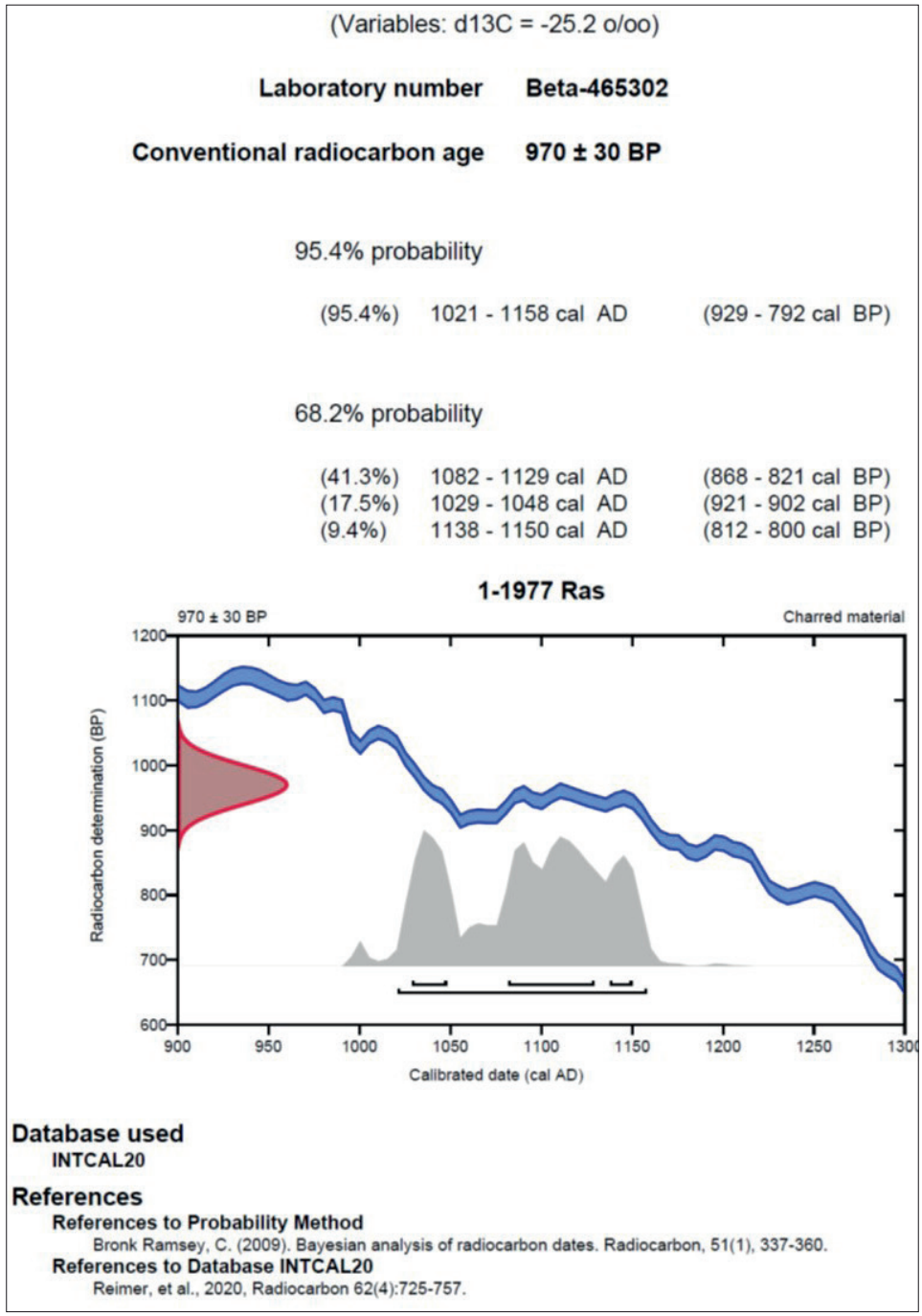

Fig. 6. Radiocarbon date calibration of the peach stone sample (*Prunus persica*) from Ras (Gradina), Serbia. (Beta Analytic Radiocarbon Dating Laboratory).

Given their soft texture, delicate nature, and high-water content, peach fruits are in general difficult to transport, suggesting that they might have been cultivated locally in the Ras region. Like many other fruits, peaches can be dried and preserved; however, their high water content makes drying them challenging. During this preservation process, the fruits are typically sliced and pitted, making the discovery of intact peach stones in archaeological contexts unlikely. Furthermore, the scarcity of finds related to fruits and nuts in archaeological sites in the region can be attributed to preservation biases[15]. The lack of systematic retrieval of plants from classical and medieval sites in this region of Southeast Europe potentially exacerbates this shortage. Hence, the discovery of peaches at the Ras site, dating back to the 11th–12th century, is of particular importance and reflects the long-standing history of peaches in Europe and the Old World, as discussed below.

Genetic diversity and continuity

Peaches (*Prunus persica* [L.] Batsch) are not native to the Balkans. They have been introduced to the region via trade routes though Persia and were distributed through the Europe and Balkans by Romans at some point in history. Peaches are native to Central and East Asia, where their cultivation dates to at least 4,000 BC[16]. They then spread through India and the territories of the Persian Empire before reaching the Greek world between the 7th and 4th centuries BC, as described in literary sources from that era[17].

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[15] Cf. C. Bakels, S. Jacomet, *Access to Luxury Foods in Central Europe during the Roman Period: the Archaeobotanical Evidence*, WArch 34, 2003, p. 542–557; A. Livarda, *Spicing up Life in Northwestern Europe: Exotic Food Plant Imports in the Roman and Medieval World*, VHA 20, 2011, p. 143–164.

[16] Archaeological discoveries push this date further and further back in time, cf. A. de Candolle, *Origin of Cultivated Plants*, New York 1959, p. 221–222; A. Steier, *Persica (Pfirsich)*, [in:] *RE*, vol. XIX.1, Stuttgart 1937, col. 1022; J. Falkowski, J. Kostrowicki, *Geografia rolnictwa świata*, Warszawa 2001, p. 324; D. Zohary, M. Hopf, *Domestication of Plants in the Old World. The Origins and Spread of Cultivated Plants in West Asia, Europe and the Nile Valley*, Oxford 1993, p. 172; M. Faust, B. Timon, *Origin and Dissemination of Peach*, HRev 17, 1995, p. 331–379; L. Sadori *et al.*, *The Introduction and Diffusion of Peach in Ancient Italy*, [in:] *Plants and Culture. Seeds of the Cultural Heritage of Europe*, ed. J.P. Morel, A.M. Mercuri, Bari 2009, p. 45; J.F. Hancock, R. Scorza, G.A. Lobos, *Peaches*, [in:] *Temperate Fruit Crop Breeding. Germplasm to Genomics*, ed. J.F. Hancock, Dodrecht 2008, p. 9; Y. Zheng, G. Crawford, X. Chen, *Archaeological Evidence for Peach (Prunus persica) Cultivation and Domestication in China*, PLOS.O 9, 2014, p. 1–9; A. Weisskopf, D.Q. Fuller, *Peach: Origins and Development*, [in:] *Encyclopaedia of Global Archaeology*, ed. C. Smith, New York 2014, p. 5840–5842. For the most recent study cf. R. Dal Martello *et al.*, *The Domestication and Dispersal of Large-fruiting Prunus spp.: A Metadata Analysis of Archaeobotanical Material*, Agr 13.4, 2023, cf. Fig. 3 Spatio-temporal distribution of *Prunus persica* remains from Eurasia and Northern Africa compiled within the database.

[17] Cf. onomastic traces of this process, as Greek names of the peach tree was *meléa persiké* (μηλέα περσική), and its fruit – *mélon persikón* (μῆλον περσικόν), abbreviated to *persiké* (περσική) or *persiká* (περσικά). Cf. *LSJ*, p. 1395; A. Steier, *Persica (Pfirsch)*…, p. 1022; *Słownik grecko-polski*,

Fig. 7. Fruit and stones (pits) of vineyard peaches from Serbia, 2012 (photos courtesy of M. Fotirić-Akšić).

In the Balkans, including present-day Serbia, there is a significant genetic diversity of peach landraces that are grown effectively wild in vineyards ("vineyard peach") and are considered ancient in origins (Fig. 7). Genetic diversity of peach germplasm at the USDA-ARS National Clonal Germplasm Repository in Davis, California, has provided valuable insights into the unique genetic profiles of peach

vol. III, ed. Z. Abramowiczówna, Warszawa 1962, p. 525. Later Greek names of the peach were: *rodákinon* (ῥοδάκινον) and *dorákinon* (δωράκινον), cf. *LBG*, vol. I, ed. E. Trapp, Wien 2001, p. 429; *LBG*, Fasz. 7, ed. E. Trapp, Wien 2011, p. 150. The lexeme for peach Slavic languages derive from *persica*, e.g., in Polish, *brzoskwinia*, in Serbian and Croatian is *breskva*, *braskva* with earlier variants such as *praskva* or *proskva*. In Hungarian, it is referred to as *barack*. These linguistic variations trace their origins to the adjective *persica*, which, in turn, signifies Persia as the originating country from which this fruit tree spread westward. Based on the linguistic evidence it has been suggested that the lexemes for peach reached the Balkan Peninsula well before the 9th century, cf. P. Skok, *Etimologijski rječnik hrvatskoga ili srpskoga jezika*, vol. I, Zagreb 1971, p. 198–199.

accessions from the Balkans and other regions of Europe[18]. This collection, which includes over 1,600 accessions representing various *Prunus* species, demonstrates how historical trade routes influenced the genetic diversity of peaches. The study utilized genotyping-by-sequencing (GBS) to analyze 510 accessions and identified significant genetic differentiation among populations from China, Persia, Europe, and the Americas. These findings suggest that the genetic diversity present in the collection is not only a result of natural adaptation but also shaped by human-mediated movements of germplasm along historical trade paths from Asia to Europe and beyond.

The analysis revealed that accessions from different geographical origins were structured into distinct genetic groups, reflecting the complex history of peach cultivation and distribution across continents. Notably, the study found that a significant portion of the accessions from the Balkans and Europe were genetically linked to germplasm from regions along the Silk Road and other trade routes that facilitated the westward spread of peach cultivars from their center of origin in China. Therefore, the Balkan Peninsula is considered a secondary center of genetic diversity in peach due to the large variability existing here resulting from different ecological conditions and human activities. Its exclusive propagation through seeds makes this native vineyard peach population an excellent reservoir of genetic diversity. The landraces of peaches grown wild in vineyards are typically small, have white flesh, are early ripening, and are found from Greece to France[19].

The region of Ras, near Novi Pazar in Serbia, is suitable for growing peaches. Serbia has a long tradition of growing fruit, and peaches are among the fruits that are commonly grown in the country. Ras has a continental climate with hot summers and cold winters, which is generally favorable for peach cultivation. In addition, the soil in the region is generally well-suited for peach trees. Peaches prefer well-drained soil rich in organic matter and nutrients, and the soil in the Ras region is typically loamy and fertile[20].

Today, the Balkans remain a significant producer of peaches, with countries such as Serbia, North Macedonia, and Bulgaria being major fruit exporters. Peaches are a popular fruit in the region, enjoyed fresh or used in various culinary preparations, such as preserves, compotes, juices, or even brewed into peach brandy.

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[18] K. Gasic *et al*., *Unlocking Genetic Potential of the Peach Collection at the National Clonal Germplasm Repository in Davis, California*, HSc 50(9S), 2015, S35; X. Li *et al*., *Peach Genetic Resources: Diversity, Population Structure and Linkage Disequilibrium*, BMC.G 14, 2013, 84.

[19] M. Faust, B. Timon, *Origin and Dissemination of Peach*, [in:] *Origin and Dissemination of Prunus Crops: Peach, Cherry, Apricot, Plum, Almond*, ed. J. Janick, Leuven 2011, p. 11–55; K. Gašić, V. Ognjanov, R. Bokošvić, K.R. Tobutt, C. James, *Characterization of Vineyard Peach Biodiversity*, AHor 546, 2001, p. 119–125; D. Nikolić, V. Rakonjac, D. Milatović, M. Fotirić, *Multivariate Analysis of Vineyard Peach [Prunus persica (L.) Batsch.] Germplasm Collection*, Euph 171, 2010, p. 227–234.

[20] P. Pavlović, N. Kostić, B. Karadžić, M. Mitrović, *The Soils of Serbia*, Dodrecht 2018, *passim*.

Archaeological evidence and insights from ancient written sources

The peaches uncovered at Ras, dating to the 11th – middle 12th century, reflect the fruit's longstanding presence in the Old World, including southeast Europe. According to archaeological evidence[21] and written sources, peaches gained popularity in the Mediterranean in antiquity, eventually becoming a delicacy in the times of the Roman Empire[22], eaten fresh and raw, dried, pickled, boiled, used as an ingredient of more complex dishes, and processed into juice[23].

The archaeological finds of peaches from the study region and Southeast Europe are still rare, due to lack of archaeobotanical work from the later periods and due to the lack of favorable preservation conditions. Furthermore, plant remains from the *Prunus* family – such as peaches, plums, almonds, cherries, and apricots – are indistinguishable based on their pollen and wood from archaeological record, making it challenging to accurately assess the extent of peach cultivation. Differentiation between these species can only be reliably achieved through the analysis of their fruit pits or stones.

In this review, we provide new and missing information about archaeological peach finds and offer a better understanding of their routes and dispersal in the Balkan region[24]. Recently published are finds of a few peach stone fragments

[21] Cf. L. Sadori *et al*., *The Introduction and Diffusion*…, p. 45–46; A. Weisskopf, D.Q. Fuller, *Peach*…, p. 5842.

[22] Cf. Pliny the Elder, *Natural History*, XV, 11, 39, vol. IV, trans. H. Rackham, Cambridge, Mass. 1968 [= LCL, 370] (cetera: Plinius, *Historia naturalis*); Lucius Junius Moderatus Columella, *On Agriculture*, X, 411, [in:] Lucius Junius Moderatus Columella, *On Agriculture X–XII; On trees*, ed. E.S. Forster, E.H. Heffner, Cambridge, Mass. 1968 [= LCL, 408]; J. André, *L'alimentation et la cuisine a Rome*, Paris 1961, p. 80. As we know from the sources, in the period of Roman Empire there were known different varieties of the peach, e.g., *gallica*, *asiatica*, *duracina*.

[23] *Pedanii Dioscuridis Anazarbei de materia medica libri V*, I, 115, 4, 6, vol. I, ed. M. Wellmann, Berolini 1906 (cetera: Dioscorides, *De materia medica*); *Oribasii collectionum medicarum reliquiae*, I, 47, 1, 1, vol. I, ed. I. Raeder, Lipsiae–Berolini 1928 (cetera: Oribasius, *Collectiones*); *Apicius. A Critical Edition with an Introduction and an English Translation of the Latin Recipe Text Apicius*, I, 26; IV, 2, 34, ed. C. Grocock, S. Grainger, Blackawton–Totnes 2006 (cetera: *De re coquinaria*); *Alexandri Tralliani de febribus*, 373, 18, vol. I; 375, 13–14, vol. I, ed. T. Puschmann, Amsterdam 1963 (cetera: Alexander Trallianus, *De febribus*). Cf. J.M. Wilkins, S. Hill, *Food in the Ancient World*, Malden 2006, p. 135.

[24] In this review of archaeological finds of peaches, we conducted internet searches, utilized Google Scholar, consulted the archaeobotany email list, and engaged in personal communication with archaeologists, archaeobotanists, and historians from Southern and Eastern Europe for further information. Notably, many *Prunus* sp. finds, including peaches from the wider area, such as Hungary, were not included in the metadata analysis of published discoveries (cf. R. Dal Martello *et al*., *The Domestication*…). While the meta-database compiled most of the finds, Excel table S1 excludes all *Prunus* finds from Roman-era archaeological sites in Hungary, mentioning only a single secondary reference to a medieval find. Relevant data from Hungary in English (cf. F. Gyulai, *Archaeobotany in Hungary*. *Seed*, *Fruit*, *Food and Beverage Remains in the Carpathian Basin from the Neolithic to the Late Middle Ages*, Budapest 2010) was available at the time of publication. Similarly, peach finds from Ras were omitted despite being documented in an English-language publication (cf. note 7).

recovered (hand-collected) from sites in Bulgaria within the Black Sea region, dating back to 4th–5th centuries BC[25]. These peach fragments were found with olive pits and often with other fruit remains and were associated with funerary offerings at the site of rural complex of Apollonia Pontica, one of the most important Greek colonies on the Western Black Sea coast (near present-day Sozopol, Bulgaria)[26]. Additionally, findings of peach and other plant remains (from excavations in Serdica [Sofia]) dated to the 4th century AD are reported based on archaeological material[27]. Further east, the earliest single find of a peach comes from the island of Samos, where waterlogged plant remains were discovered in a well associated with the sanctuary of Hera, dated to the 7th century BC[28]. The earliest documented discoveries of peaches and other charred plant remains from the southeastern region of Anatolia come from the Roman-era site of Zeugma, indicating that peaches were introduced to the area by the mid-2nd century AD[29]. Shipwrecks found in Theodosian-filled harbor, present-day Istanbul, dating back to the 9th century AD, contained a well-preserved (waterlogged) cargo dominated by fruit, particularly numerous peach remains[30]. Additionally, waterlogged two peach pits were discovered from amphorae on a shipwreck of a merchant vessel, dated to around 1025 AD, near the coast of Rhodes[31]. This suggests an established history of peach production and commerce, at least in Asia Minor by the middle Byzantine period.

Heading westward, several peach pits have been discovered in Pannonia (Hungary), dating back to the 1st century AD within Roman-era archaeological sites.

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[25] T. Popova, *New Archaeobotanical Evidence about Olea europaea subsp. europaea from the Territory of Bulgaria*, *ИИз* 27, 2022, p. 43–58.

[26] Cf. T. Popova, *New Archaeobotanical Evidence about Olea*…, Table 1, p. 46, Apollonia Pontica: Site is MESARITE 4, Unit S139, near burial N18. Plant remains identified: *Olea europaea* subsp. europaea (6 finds, 1 from the 4th century BCE, Popova, unpublished). Funeral, ritual food offerings included *Corylus avellana* (8 finds), *Prunus amygdalus* (1 find), and *Prunus persica*. Since Bulgaria is unsuitable for olive cultivation, the author deduced that olives and other fruits found in burial contexts and ritual offerings were imported from neighboring Mediterranean regions to the south.

[27] T. Popova, *New Archaeobotanical Evidence for Trigonella foenum-graecum L. from the 4th Century Serdica*, QInt 460, 2017, p. 157–166.

[28] The single peach find was identified as "*Prunus punica*" (*peche*) together with a number of pomegranate seeds and was dated based on its association with other archaeological materials found in the Sanctuary of Hera. Cf. D. Kučan, *Zur Ernährung und dem Gebrauch von Pflanzen im Heraion von Samos im 7. Jahrhundert v. Chr.*, JDAI 110, 1995, p. 1–64; idem, *Rapport synthétique sur les recherches archéobotaniques dans le sanctuaire d'Héra de l'île de Samos*, Pall 52, 2000, p. 99–108, I–IV.

[29] D. Challinor, D. de Moulins, *Charred Plant Remains*, [in:] *Excavations at Zeugma conducted by Oxford Archaeology*, vol. III, ed. W. Aylward, Los Altos 2013, p. 411–432.

[30] J. Marston, L. Castellano, *Crop Introductions and Agricultural Change in Anatolia during the Long First Millennium ce*, VHA 2023, p. 1–14 (article published online on 26 V 2023).

[31] C. Ward, *Plant Remains*, [in:] *Serçe Limani: an Eleventh-Century Shipwreck*, vol. I, *The Ship and its Anchorage, Crew, and Passengers*, ed. G.F. Bass *et al.*, College Station 2004, p. 497–501.

It is believed that the Romans introduced peach growing into present-day Hungary[32]. The earliest single find of a peach stone comes from a Late Iron Age site of Regöly, in western Hungary, dated to the La Tène period based on its association of the archaeological material (the Late Iron Age)[33]. The finds of peaches from the older excavations in present-day Austria come from the Roman sites (Kastel Lenitia and Penzendorf bei Hartberg) and are dated to the 1st c. AD[34].

Further west, in Northern Italy, the peaches can be traced back to the Augustan-Tiberian age (29 BC – 37 AD) at funerary contexts at necropolises (Angera and Manerbio). Peache stones were found in a variety of contexts including settlements and cemeteries. In the ancient Roman town of Mutina (present-day Modena), over a hundred uncharred peach pits were excavated from a Roman channel dating to between 15–40 AD[35]. There was already a wide variety of shapes and sizes in the peach endocarps found at Mutina[36]. Notably, these findings predate the introduction of peaches in central Italy by at least a decade, as suggested by Pliny's *Historia naturalis*. The earliest known artistic representation of peaches can be found in 1st-century wall paintings in Casa dei Cervi, Herculaneum[37]. The absence of early peach discoveries in Rome, the heart of the Roman Empire, may be attributed to classical archeologists' selective recovery of plant remains unless it reflected the higher social status of Northern Italian inhabitants[38]. Peaches likely entered Italy primarily through maritime routes, although the possibility of introduction from Greece through the Balkans cannot be entirely dismissed. This importation

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[32] Individual peach stones were identified from three Roman sites in Hungary, and many medieval sites. Cf. F. Gyulai, *Archaeobotany in Hungary*…, p. 38 and tables.

[33] G. Facsar, E. Jerem, *Zum Urgeschichtlichen Weinbau in Mitteleuropa: Rebkernfunde von Vitis vinifera L. aus der urnenfelder-, hallstattund latenezeitlichen Siedlung Sopron-Krautacker*, WAB 71, 1985, p. 121–144. Single peach finds come from a profile of pit cf. Tafel IV, p. 142.

[34] H.L. von Werneck, *Römischer und vorrömischer Wein- und Obstbau im österreichischen Donauraum*, VZBGW 96, 1956, p. 144–181. H.L. von Werneck only mentions finds of peach and cites references from the excavations in Linz 1953/1954, published by P. Karnitsch (*Fundberichte im Jahrbuch der Stadt Linz 1951*, PAR 3.7/8, 1953, p. 26 and idem, *Die Wehrgräben des römischen Kastells Lentia*, OHei 8, 1954, p. 182–186).

[35] L. Sadori *et al*., *The Introduction and Diffusion*…, p. 46. The earliest peach finds, dated to the early 1st century AD (29 BC – 37 AD), consisted of charred endocarps., citing report by Castelletti 1985: L. Castelletti, *Resti vegetali macroscopici e resti di cibo dalla necropoli romana di Angera (Varese, Italia)*, [in:] *Angera Romana – scavi nella necropoli*, ed. G. Sena Chiesa, Roma 1985, p. 591–595. For finds from and of Manerbio, near Brescia, Castiglioni and Rottoli unpublished article was cited.

[36] L. Sadori *et al*., *The Introduction and Diffusion*…, p. 46. Cf. G. Bosi, E. Castiglioni, R. Rinaldi, M. Mazzanti, M. Marchesini, M. Rottoli, *Archaeobotanical Evidence of Food Plants in Northern Italy during the Roman Period*, VHA 29, 2020, p. 681–697.

[37] Cf. L. Sadori *et al*., *The Introduction and Diffusion*…, p. 46, Image 1. A fragment of a fresco depicting peaches from Casa dei Cervi, Herculaneum (inv. 8645) is exhibited in the National Archaeological Museum of Naples.

[38] *Ibidem*.

probably took place relatively early, moving from the center of the Roman Empire towards its central-northern provinces[39].

The discovery of early peach finds in Cisalpine Gaul (northern Italy) and Pannonia (Hungary) raises questions whether peaches were cultivated in Gaul before making their way to Italy. It is plausible that the Celts played a significant role in the dissemination of peaches, potentially migrating from the Pontus region through the Balkans-Danube route. These early discoveries of peach stones provide secondary evidence supporting the existence of the "via Balcani" route, further reinforced by the continual presence of various vineyard peach varieties in the region since ancient times[40].

During the 1st century, peaches had already spread westwards, reaching at least Gaul, although they faced challenges adapting to cooler climates than the eastern Mediterranean climate. Additionally, a few varieties of peaches were already known at that time (see footnote 22). Conversely, due to the fragility of peach trees and the challenges in storing and transporting fresh fruits[41], peaches were scarce and expensive, making them typically unattainable for the majority of the poorer population in the Roman Empire[42].

The archaeological evidence suggests that peaches spread to northwest Europe alongside the Roman army, as they were widely present along the *limes* during Roman times. During the medieval era, peaches shifted towards the northeastern part of central Europe, and their presence in both writings and archaeological records decreased significantly between the fourth and eighth centuries. In the medieval period, these peaches were primarily found in urban deposits[43].

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[39] L. Sadori *et al*., suggest the maritime route for the introduction of peaches into Italy. D. Bassi and M.C. Piagnani (*Botanica*. *Morfologia e fenologia*, [in:] *Il pesco*, ed. R. Angelini, Bologna 2008, p. 1–17) propose the possibility of their introduction from Greece through the Balkans, as cited in Sadori *et al*.

[40] M. Faust, B. Timon, *Origin and Dissemination* 2011…, p. 11–55. D. Bassi, M.C. Piagnani, *Botanica*. *Morfologia*…, p. 1–17. D. Bassi, R. Monet, *Botany and Taxonomy*, [in:] *The Peach*. *Botany*, *Production and Uses*, ed. D.R. Layne, D. Bassi, Wallingford 2008, p. 1–30. Peach remains were found at nearly half of the surveyed archaeological sites (114) in Northern Italy, including settlements and sanctuaries from the 1st–2nd century.

[41] Because fresh peaches spoil quickly, ancient people attempted to preserve them through various methods, including drying, boiling, steaming, pickling, and pressing to obtain juice. For details on these processes, cf. Dioscorides, *De materia medica*, I, 115, 4; *De re coquinaria*, I, 26; IV, 2, 34; Alexander Trallianus, *De febribus*, 373, 18, vol. I; 375, 13–14, vol. II; *Geoponica sive Cassiani Bassi Scholastici de re rustica eclogae*, VIII, 34, rec. H. Beckh, Lipsiae 1895 [= BSGR] (cetera: *Geoponika*).

[42] Plinius, *Historia naturalis*, XV, 11, 40. Cf. N. Blan, *Charlemagne's Peaches: a Case of Early Medieval European Ecological Adaptation*, EME 27.4, 2019, p. 523, 526. On the other hand, as for the value of peaches, edict of Diocletian from AD 301 shows that they should be available in similar prices as pears and better varieties of apples, so, in other words, not expensive, cf. *Edictum Diocletiani de pretiis rerum venalium*, 7, 58–62, ed. A. Barańska, P. Barański, P. Janiszewski, Poznań 2007. This difference shows probably the general change in availability of peaches between 1st and 3rd/4th c. AD.

[43] A. Livarda, *Spicing up Life*…, p. 143–164. For the finds of peach (*Prunus persica*) from the excavations of the selected late medieval sites in Slavonia, Croatia, cf. K. Reed, A. Smuk, T. Tkalčec,

Both archaeological findings and Latin written sources indicate that peach trees were cultivated in Italy as early as the 1st century AD[44]. Pliny the Elder's detailed description suggests that peaches reached Italy from Egypt through Rhodes, but not until a few decades before he wrote about them in his work[45]. Although we should not overly trust the geographical details of this account[46], its chronology is confirmed by the results of archaeological excavations. Another possible route involved the spread of peaches to the West through the Balkan Peninsula.

Throughout the entire period of late antiquity, the popularity of peaches seems to have remained consistent, as indicated in written sources[47] and corroborated by archeological evidence, including art[48]. Interestingly, this popularity persisted despite the mixed opinions about peaches and their impact on the human body expressed by Greek and Roman physicians and medical writers. Influential figures like Galen (2nd/3rd century AD)[49] were among those who held a negative view of peaches[50].

J. Balen, M. Mihaljević, *Food and Agriculture in Slavonia*, *Croatia*, *during the Late Middle Ages: the Archaeobotanical Evidence*, VHA 31, 2022, p. 347–361.

[44] L. Sadori *et al.*, *The Introduction and Diffusion…*, p. 45–46; A. Weisskopf, D.Q. Fuller, *Peach…*, p. 5842; A. Marzano, *Plants*, *Politics and Empire in Ancient Rome*, Cambridge 2022, p. 179–181, 184–186.

[45] Plinius, *Historia naturalis*, XV, 11, 39; XV, 13, 45; cf. J. André, *L'alimentation…*, p. 81; K.D. White, *Roman Farming*, London 1970, p. 258; N. Blan, *Charlemagne's Peaches…*, p. 523.

[46] It is unlikely that Pliny had accurate geographical details when describing the process. Additionally, Pliny's description closely resembles a fragment from Theophrastus's passage about the origins of a plant called *persea* (distinct from *persica*, our peach; cf. Theophrastus, *Enquiry into Plants*, II, 2, 10, vol. I, ed. A. Hort, Cambridge, Mass. 1916 [= LCL, 70]). This suggests that Pliny may have misinterpreted his source, leading to potential errors in reconstructing the process of peach dissemination.

[47] Martial, *Epigrams*, XIII, 46, vol. III, ed. D.R.S. Bailey, Cambridge, Mass. 1993 [= LCL, 94]; *Palladii Rutilii Tauri Aemiliani viri inlustris opus agriculturae. De veterinaria medicina. De insitione*, I, 35; I, 37, ed. R.H. Rodgers, Leipzig 1975 [= BSGR]; *Historia Augusta*, XVIII, 13, 6–7, vol. II, ed. D. Magie, D. Rohrbacher, Cambridge, Mass. 2022 [= LCL, 140]; cf. also *Geoponika*, III, 1 (the fragment taken probably from the Quintilii brothers, active in the 2nd c.); X, 3 (the fragment taken from Didymos, active probably around 4th/5th c.); X, 13 (the fragment taken from Florentinus, active in 3rd c.); X, 16 (the fragment taken from Sex. Julius Africanus, active in 3rd c.). There is also a short mention of peach tree growing in Thebaida in the times of emperor Julian reign (4th c.) in *Georgii Cedreni historiarium compendium*, 322, 3, vol. II, ed. L. Tartaglia, Roma 2016.

[48] Cf. L. Farrar, *Ancient Roman Gardens*, Strout 1988, p. 145; L. Sadori *et al.*, *The Introduction and Diffusion…*, p. 47–53; M. Ciaraldi, *People and Plants in Ancient Pompeii – a New Approach to Urbanism from the Microscope Room. The Use of Plant Resources at Pompeii and in the Pompeian Area from the 6th Century BC to AD 79*, London 2007, p. 62–63, 123–124, 165; A. Marzano, *Plants*, *Politics…*, p. 184–185.

[49] *Galeni de alimentorum facultatibus libri III*, 466, 5–13; 569, 11–23; 593, 1–2, [in:] *Claudii Galeni opera omnia*, vol. VI, ed. C.G. Kühn, Lipsiae 1823; *Galeni de victu attenuante*, 77, 3–78, 1, ed. K. Kalbfleisch, Leipzig–Berlin 1923; *Galeni de rebus boni malique suci libellus*, 785, 3–7; 785, 13 – 786, 1, ed. G. Helmreich, Lipsiae 1923.

[50] For example, Gargilius Martialis, *Les remèdes tirés des légumes et des fruits*, 44, ed. B. Maire, Paris 2002; Oribasius, *Collectiones*, I, 47, 1–4; III, 14, 7, 5; III, 27, 1, 2, 1; *Oribasii synopsis ad Eustathium filium*, II, 7, 1, 8–9; IV, 13, 6, 5, [in:] *Oribasii synopsis ad Eustathium et libri ad Eunapium*,

The collapse of the Western Roman Empire brought about significant and multifaceted changes across Western Europe, affecting agriculture, horticulture, and culinary practices throughout the vast region. The peaches serve as an illustrative example of these transformations. Cultivating peach trees in the cooler areas north of the Mediterranean demanded considerable care and expertise, but after the 5th century, this practice deteriorated[51]. The precise details of this process are now lost to history and likely vary in different regions. Consequently, peaches became scarce commodities during the early medieval period compared to their abundance in Roman times. The trade challenges, particularly over long distances, would have further deepened this shift.

The case of 6th-century Gaul, ruled by the Franks, is particularly noteworthy. While there are occasional mentions of peaches in written sources from that era – like the recommendation of peaches to King Theuderic by the Constantinopolitan physician Anthimus[52] and a mention by the poet Venantius Fortunatus[53] – it is unclear whether these references were mere literary conventions or reflected the reality of the Merovingian world. However, archaeological excavations revealed a significant decline in peach remains from the end of Roman rule to the Carolingian period (between the 6th and 8th centuries)[54]. In other territories of the collapsed Roman Empire, like Italy under Ostrogothic rule, archaeological excavations from the early medieval period showed a significant decline in peach remains compared to the late Roman period[55].

Local cultivation: Byzantine legacy

The scenario of peach cultivation was distinct within the Byzantine Empire, especially within the Balkan Peninsula, which is of particular interest for this study. Some of its southern provinces, in the eastern Mediterranean and Asia Minor, had optimal climate conditions for peach tree cultivation, requiring less upkeep than in the western regions. Consequently, even invasions, the arrival of new peoples, or the decline of earlier societies did not necessarily lead to the demise of this aspect of arboriculture, as it did not require the same level of agronomical expertise needed in northern regions. The archaeological data from different

ed. I. Raeder, Lipsiae–Berolini 1926; *Aetii Amideni libri medicinales I–IV*, I, 278, 5–12, ed. A. Olivieri, Lipsiae–Berolini 1935 [= CMG, 8].

[51] A. Livarda, *Spicing up Life*…, p. 147, 149; N. Blan, *Charlemagne's Peaches*…, p. 525.

[52] Anthimus, *On the Observance of Foods. De observatione ciborum*, 85, ed. M. Grant, Totnes–Blackawton 2007.

[53] *Venanti Fortunati carmina*, VII, 14, [in:] *Venanti Honori Clementiani Fortunati presbyteri italici opera pedestria*, rec. F. Leo, Berolini 1881.

[54] N. Blan, *Charlemagne's Peaches*…, p. 525.

[55] L. Sadori *et al.*, *The Introduction and Diffusion*…, p. 53.

parts of the Byzantine Near East and Asia Minor show the presence of peach trees in the gardens in the early period (5th–7th c.)[56] and the later centuries[57].

Byzantine written sources from the early period do not offer a comprehensive understanding regarding the status of peach. Firstly, they lack direct information regarding the popularity of peaches, limiting our ability to draw precise conclusions. Alexander of Tralles (6th/7th century), an experienced physician who often deviated from his predecessors' views, did provide a positive assessment of this fruit in his treatises *Therapeutica* and *De febribus*[58]. This may indicate a significant shift in the Greeks' perspective on peaches, perhaps influenced by their more frequent presence (though not necessarily common and regular) in diets. Furthermore, Hierophilus' dietetic calendar from the 7th century advised the consumption of peaches during the arid months of the year (July, August, or September, depending on the text version) to help maintain the body's good condition[59]. However, this viewpoint is not found in the writings of other authors like Paul of Aegina[60] and the anonymous treatise *De cibis*[61] (both from the 7th century), as they continued to be strongly influenced by Galen's doctrines. Interestingly, even Alexander cautioned against the consumption of peaches in another section of his *Therapeutica*[62].

In the subsequent centuries, the cultivation of peach trees experienced a revival in the European regions where it had previously declined, e.g., Gaul[63]. Additionally,

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[56] Cf. P. Crawford, *The Plant Remains*, [in:] *The Roman Frontier in Central Jordan. Final Report on the Limes arabicus Project 1980–1989*, vol. II, ed. S.T. Parker, Washington 2006, p. 456; K.D. Politis, *The Economic Transformation of Zoara in Eastern Palaestina Tertia from the Late Antique to Early Islamic Period (6th–11th Century)*, [in:] *Transformations of City and Countryside in the Byzantine Period*, ed. B. Böhlendorf-Arslan, R. Schick, Mainz 2020, p. 96.

[57] *TIB*, vol. VII, *Phrygien und Pisidien*, ed. K. Belke, N. Mersich, Wien 1990, p. 63; *TIB*, vol. XV, *Syria (Syria Prōtē*, *Syria Deutera*, *Syria Euphratēsia)*, T. 1, ed. K.-P. Todt, B.A. Vest, Wien 2014, p. 483–510. About peaches in orchards or gardens in Byzantine monasteries – with no exact information about the period of time – writes Alice-Mary Talbot (*Byzantine Monastic Horticulture: the Textual Evidence*, [in:] *Byzantine Garden Culture*, ed. A. Littlewood, H. Maguire, J. Wolschke-Bulmann, Washington 2002, p. 52). Importantly, the number of peach remains from Byzantine sites is generally not high.

[58] *Alexandri Tralliani therapeutica*, 511, 13–14, vol. I; 251, 11–14, vol. II; 265, 1–12, vol. II; 279, 19–283, 9, vol. II, ed. T. Puschmann, Amsterdam 1963 (cetera: Alexander Trallianus, *Therapeutica*); Alexander Trallianus, *De febribus*, 373, 18; 375, 13–14, vol. I.

[59] *Hierophili de nutriendi methodo*, 8, 3, [in:] *Physici et medici graeci minores*, vol. I, ed. I.L. Ideler, Berlin 1841; cf. A. Dalby, *Tastes of Byzantium. The Cuisine of a Legendary Empire*, London 2010, p. 53, 222 (English translation based on Delatte 1939 edition of the text).

[60] *Paulus Aegineta*, I, 81, 2, 3–5, vol. I, ed. I.L. Heiberg, Lipsiae–Berolini 1921 [= CMG, 9.1].

[61] *De cibis*, 12; 22; 28, [in:] *Anecdota medica graeca*, ed. F.Z. Ermerins, Lugduni Batavorum 1840.

[62] Alexander Trallianus, *Therapeutica*, 523, 26–27, vol. I.

[63] E. Peytremann, *Rural Life and Work in Northern Gaul during the Early Middle Ages*, [in:] *The Oxford Handbook of the Merovingian World*, ed. B. Effros, I. Moreira, Oxford 2020, p. 706.

peaches were introduced into areas where they had not been documented before, such as lands inhabited by tribes that later became part of the Polish state[64].

The Medieval Byzantine Empire had considerable dominance over the Balkans, particularly between the 10th and 11th centuries, when it held substantial military power and exerted direct control over significant portions of the Peninsula, including Ras and areas inhabited by Serbs[65]. It is essential to investigate the preserved accounts regarding peaches by Byzantine individuals from that era. This exploration is particularly relevant since prolonged periods of domination frequently involve political control and extend to agricultural and culinary influences and impacts[66].

As mentioned above, peaches were known in the Northern Balkans by at least the 1st century AD. However, detailing the specific variations in its cultivation and prevalence in subsequent centuries proves challenging, particularly in the context of the pressure and settlements by the Slavs. This situation could have led to temporary declines, paralleling the impact of Germanic tribes in Western Europe.

So, what do Medieval Byzantine writings reveal about peaches? *Geoponika*, a compilation of agronomical texts from the 10th century under Emperor Constantine VII Porphyrogennitus, holds a trove of information on cultivation techniques and existing varieties during that era. This compilation, mirroring the realities of its time (despite being based on earlier treatises), presents precise and factual observations, confirming the regular occurrence of peaches in Byzantine agriculture[67].

The peach was also a subject of medical literature at that time. It is discussed in the treatise titled *Synopsis de remediis*[68], commonly attributed to Theophanes Chrysobalantes from the 10th century, as well as in *Syntagma de alimentorum facultatibus*[69] authored by Symeon Seth in the 11th century. Their accounts align with earlier ones and remain influenced by Galenic principles.

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[64] M. Lityńska-Zając, D. Nalepka, *Średniowieczny świat roślin i pożywienie w świetle źródeł paleobotanicznych*, [in:] *Źródła historyczne wydobywane z ziemi*, ed. S. Suchodolski, Wrocław 2008, p. 87; D. Błaszczyk, J. Beaumont, A. Krzyszowski, D. Poliński, A. Drozd-Lipińska, A. Wrzesińska, J. Wrzesiński, *Social Status and Diet. Reconstruction of Diet of Individuals Buried in Some Early Medieval Chamber Graves from Poland by Carbon and Nitrogen Stable Isotopes Analysis*, JAS.R 38, 2021, 103103.

[65] See footnote 16 and 17 for the linguistic evidence regarding peaches and the Slavic lexemes, particularly how they may have entered the Balkan Peninsula prior to the 9th century.

[66] Similar influences can be observed from the past such as Greek impacts on Roman culinary customs, Roman influences on the Celts and Germanic tribes, and others.

[67] *Geoponika*, III, 1; VIII, 34; X, 3; X, 14–17; X, 76. In the text one can find general information about growing of peach tree and some remarks devoted to usefulness of its fruit.

[68] *Synopsis de remediis*, 8 (II, 262, 29); 20 (II, 267, 4); 28 (II, 269, 16), [in:] *Physici et medici graeci minores*, vol. II, ed. I.L. Ideler, Berolini 1842.

[69] *Simeonis Sethi syntagma de alimentorum facultatibus*, ρ, 28–50, ed. B. Langkavel, Lipsiae 1868 [= BSGR].

Similarly, but at a later date (13th century), references to the medical application of peaches appear, notably in the Nicolaus Myrepsus's treatise[70] and in an anonymous work often attributed to a certain John, titled *Synoptic iatrosophion*[71]. Both works provide practical recommendations for treating common ailments. Significantly, these fruits are recorded alongside numerous other fruit varieties typical for the region without any indication of their being uncommon. This recurring theme further reinforces the impression of peaches' continual presence in the medieval Byzantine markets.

References to peaches and peach trees can be found in medical and agronomical sources and various other texts. For example, the *Suda*[72] lexicon, compiled in the 10th century, includes two entries about peaches (περσικαί and ῥοδακινέα), reflecting the shifts in Greek terminology from the Hellenistic to the medieval period. Unfortunately, both entries are quite brief and lack details about peach cultivation or consumption. Peaches, alongside grapes, were also mentioned in one of the letters authored by Eustathius of Thessalonike in the 12th century[73].

The significance of peaches in the medieval Byzantine world, including the Balkans around the 11th century, is evident in written sources and other evidence. It is well-established that peach trees continued to thrive in Byzantine orchards and gardens[74]. Furthermore, these fruits were actively traded and transported, sometimes over considerable distances. For instance, archaeologists discovered, as mentioned above, peaches within amphorae on a merchant vessel wrecked around 1025 near the coast of Rhodes. These observations and the remains demonstrate that peaches were neither exotic nor uncommon in the Byzantine world during the 11th century[75].

Routes of introduction and local cultivation

The finds of peaches from Ras is the only evidence we have of peach from the archaeological sites in the region of Serbia thus far. The fragments of peach stones were directly radiocarbon dated to 1021 to 1158 cal AD. The discovery of peach stones at Ras, dated between the early 11th and mid-12th centuries, suggests

[70] *Nikolaos Myrepsos' Dynameron*, δροσάτα, 8, 15, 3–5, ed. I. Valiakos, Heidelberg 2020.

[71] *John the Physician's Therapeutics. A Medical Handbook in Vernacular Greek*, ϰ 84; ω 101, ed. B. Zipser, Leiden 2009 [= SAM, 37].

[72] *Suidae lexicon*, π, 1376; ρ, 194, vol. IV, ed. A. Adler, Stutgardiae 1989 [= LG, 1.5].

[73] *Eustathii Thessalonicensis epistolae*, 1, 1–7, [in:] *Eustathii metropolitae thessalonicensis opuscula*, ed. T.L.F. Tafel, Francofurti ad Moenum 1832.

[74] A.E. Reuter, *Food Production and Consumption in the Byzantine Empire in Light of the Archaeobotanical Finds*, [in:] *Multidisciplinary Approaches to Food and Foodways in the Medieval Eastern Mediterranean*, ed. S.Y. Waksman, Lyon 2020, p. 343–354.

[75] C. Ward, *Plant Remains*…, p. 497–501; E. Todorova, *One Amphora, Different Contents*, [in:] *Multidisciplinary Approaches to Food*…, p. 403–416.

a continuity of practices linked to the 'via Balcani' route, which may have begun centuries earlier with the introduction of peaches from the Pontic region[76]. Peaches might have been transported from the Black Sea area along the Danube, through central Europe, possibly reaching northern Italy and Gaul by the first centuries AD. Historical sources propose that peaches were introduced to the Gallia province early on, not through Italy but via the Balkans. Pliny the Elder notes the presence of peaches in Gaul alongside those in Rome. In the first century, Columella, and in the fourth century, Palladius documented peaches grown in Italy with Gallic origin. This aligns with insights from peach horticulturists emphasizing the prolonged cultivation and diversity of local vineyard peach landraces in the Balkans.

The significance of peaches in the medieval Byzantine world, including the Balkans, is evident not only in written sources but also through archaeological finds, which firmly establish the persistence of peach trees in Byzantine orchards and gardens. The discovery of a wide variety of well-preserved peach endocarps of different shapes and sizes at the site of Mutina in Northern Italy suggests that, by the 1st century, diversity among peach varieties had already developed, indicating that the fruit's introduction to Italy was preceded by earlier cultivation in other regions. If the dating of peach finds dating back to 4th–5th centuries BC from Black Sea sites in Bulgaria is accurate, these discoveries could be the oldest documented peach findings in Europe[77]. As more peach remains are discovered from the Black Sea region and southeast Europe, they will further will contribute to a better understanding the of routes, and underscore the importance of using direct radiocarbon dating of peach remains from archaeological sites to trace its history across the region.

Several possible routes may have introduced peach cultivation to the Balkans over different historical periods. These routes include: 1) the ancient Silk Road: peaches could have been introduced to the Balkans along or through the ancient Silk Road, predating the Roman expansion; 2) Maritime routes: peaches may have been imported into Europe through naval routes, reaching regions like Italy through sea trade and expanding to central and eastern Europe through the Roman army; 3) Byzantine trade: the Byzantine Empire's significant influence on the Balkans, especially during the Middle Ages, might have (re)introduced peach cultivation to the region through cultural exchange.

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[76] Cf. M. Faust, B. Timon, *Origin and Dissemination* 2011…, *passim*. The early discoveries of peach remains at archaeological sites in Austria and Hungary, dating from the 1st century BC to the 1st century AD (see footnotes 32–34), may precede the Romanization of the area. Regional peach horticulturists have cited these finds, and along with the long-standing cultivation of vineyard peaches in the region, they proposed the possibility of peaches being introduced via a route from the Black Sea. This Balkan route was adopted and referred to as 'via Balkani' by Italian peach specialists c.f. D. Bassi, M.C. Piagnani, *Botanica. Morfologia*…, *passim*; A. Marzano, *Plants*, *Politics*…, p. 177–197.

[77] See notes 24 and 26; cf. T. Popova, *New Archaeobotanical Evidence about Olea*…, p. 43–58.

Future research on ancient DNA (aDNA) from well-preserved peach remains found at archaeological sites, compared with modern and historical varieties – such as vineyard peaches – could provide valuable further insights into the origins of peaches and the possible routes of their spread[78].

Conclusions

In this interdisciplinary study, we reviewed historical records and provided new insights, addressing gaps in the archaeological evidence of peach finds from Southeast Europe. Our research offers a clearer understanding of the routes and dispersal of peaches in the Balkans and beyond. Archaeological excavations at Ras uncovered peach stones and plant remains, indicating peach cultivation in the region as early as the 11th century, possibly earlier. The exact origin of these peaches remains uncertain – whether they were introduced by the Romans in the 4th century during their occupation of the region or brought from the south by the Byzantines. Nevertheless, the genetic diversity of peach landraces in the Balkans, including present-day Serbia, suggests continuity along the 'via Balcani' route and enduring local cultivation, potentially supported by trade from southern regions since ancient times.

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