



A Bit More Complicated Than It Seemed

Sonja Kačar, Emil Podrug

► To cite this version:

Sonja Kačar, Emil Podrug. A Bit More Complicated Than It Seemed: Revisiting Chrono-Cultural Framework of the Open-Air Late Upper Paleolithic and Neolithic Site in Konjevrate (Dalmatia, Croatia). Hiatus, lacunes et absences: identifier et interpréter les vides archéologiques. Actes du 29e Congrès préhistorique de France, 31 mai-4 juin 2021, Toulouse, Session Les espaces vides: preuves d'absences ou absences de preuves?, Société préhistorique française, pp.105-120, 2024. hal-04537594

HAL Id: hal-04537594

<https://hal.science/hal-04537594>

Submitted on 11 Apr 2024

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Open licence - etalab

A Bit More Complicated Than It Seemed: Revisiting Chrono-Cultural Framework of the Open-Air Late Upper Paleolithic and Neolithic Site in Konjevrate (Dalmatia, Croatia)

Démêler l'écheveau : Une révision du cadre chronoculturel du site de plein air datant du Paléolithique supérieur et du Néolithique ancien de Konjevrate (Dalmatie, Croatie)

Sonja KAČAR, Emil PODRUG

Abstract: The open-air archaeological site of Konjevrate-Groblje was discovered in 1988 and subsequently partly excavated in four campaigns. In preliminary reports, the site was interpreted as being a Neolithic Impressed Ware settlement. Several thousand chipped-stone artifacts were initially attributed to the same Neolithic phase and interpreted as the remains of a lithic “workshop” within the village. Recently, the collected assemblage was revisited and re-examined: analyses of the pottery confirmed its Early Neolithic date, but surprisingly, most of the lithic assemblage showed characteristics of the Epigravettian industry. A new excavation campaign was conducted in 2018 to further investigate the chronological sequence of Konjevrate and determine whether an Epigravettian date could be corroborated. The results of this investigation demonstrated that the two cultural-chronological occupation episodes that were suggested for the assemblage can also be clearly distinguished stratigraphically *in situ*. Moreover, the excavation results, combined with the accidental and surface finds collected in the vicinity, suggested that the site’s occupation sequence spanned a part of the Upper Paleolithic, throughout the Neolithic and possibly into the early Copper Age. As such, the case of the Konjevrate-Groblje site serves as a good example of the importance of revisiting archaeological assemblages in museum collections and shows how, based on the high level of specialization of researchers’ expertise in archaeology today, revisiting old assemblages can shed new light on a site’s complexities and importance.

Keywords: Dalmatia, Eastern Adriatic, Epigravettian, Impressed Ware pottery, lithics, lever-pressure blade, open-air site.

Résumé : Le site de Konjevrate-Groblje est situé près d’un étang dans le village de Konjevrate, à environ 10 km au nord-est de Šibenik, en Dalmatie, Croatie. La majeure partie du site a été endommagée par la construction de l’église médiévale et moderne de Saint-Jean et de son cimetière. Des fouilles de sauvetage ont été menées dans les années 1980 et 1990, et le site avait alors été attribué, par la présence de la céramique Impressa, au Néolithique ancien et interprété, par l’abondance des vestiges lithiques, comme un atelier de taille (Mendušić, 1990). Cependant, une révision des assemblages conservés au musée de Šibenik, l’obtention de nouvelles dates ¹⁴C et l’ouverture d’une nouvelle fouille ont montré que la chronologie du site est en réalité beaucoup plus complexe. Si l’étude typo-stylistique de l’assemblage céramique confirme l’attribution à la phase Impressa (Korić et Horvat, 2018), ce que corroborent les datations au radio-carbone situant la fosse dans le premier quart du VI^e millénaire av. J.-C., plusieurs dates indiquent la possibilité d’une occupation plus longue, jusqu’à la seconde moitié du VI^e millénaire av. J.-C., c’est-à-dire au Néolithique moyen (McClure *et al.*, 2014). Une séquence d’occupation plus complexe a en outre été suggérée par l’analyse interdisciplinaire de l’assemblage lithique (Kačar, 2019a ; Perhoč, 2020). La production, caractérisée par une diversité surprenante des roches utilisées, indique une véritable économie des matières pre-

mières et s'avère différente de tous les autres assemblages dalmates datant du Néolithique ancien. En effet, les données archéologiques montrent un recours exclusif aux matières premières d'origine exogène (Gargano, Italie) dans la production laminaire par pression durant le Néolithique, tandis que la production des lames et des lamelles, pour les périodes antérieures, se caractérise par l'emploi de matières premières locales et régionales, et de la percussion directe (Vukosavljević, 2012 ; Kačar, 2019b). De plus, les lames lustrées, dominantes au Néolithique, ne sont représentées dans le corpus que par un seul exemplaire. À cela s'ajoutent les découvertes accidentelles signalées dans la zone du cimetière : une lame par pression au levier, mesurant 25,4 cm × 2,7 cm × 0,8 cm, découverte dans un contexte funéraire en 1979 ; et le rhyton en céramique de la phase Danilo, qui selon le prêtre de la paroisse a été trouvé près de la maison du vicaire dans les années 1990. Afin de confirmer le schéma culturel-chronologique nouvellement proposé pour le site, une fouille de révision a été menée en 2018. Les deux unités XI et XII ont alors été ouvertes. Alors que cette dernière se révélait archéologiquement stérile, dans l'unité XI, sous les couches également stériles SU1 et SU2, la couche SU3 était caractérisée par une abondance de vestiges lithiques, par une absence de céramique et par la rareté des artefacts organiques. L'analyse préliminaire des vestiges lithiques suggère une attribution épigravettienne (silex local et régional, production lamino-lamellaire par percussion directe, présence des lamelles et pointes à dos). Compte tenu des analyses préliminaires micro-morphologiques, qui suggèrent que l'absence d'éléments organiques ne peut pas être expliquée par les facteurs taphonomiques, il est possible d'interpréter cette occupation comme une zone d'exploitation du silex. Après une longue pause, le site fut fréquenté au Néolithique ancien, comme en témoignent une fosse ovale au sol recouvert de pierres, contenant de la poterie Impressa, des ossements d'animaux domestiques et quelques éléments lithiques (dominés par des lames en silex garaganique). Finalement, les découvertes sporadiques suggèrent une fréquentation du site durant les phases plus récentes du Néolithique, voire au Chalcolithique. Ces nouveaux éléments ne confirment pas les interprétations initiales et montrent l'importance des révisions des anciens assemblages, ce qui sous-entend un travail de spécialistes, ainsi que la nécessité de nouvelles fouilles.

Mots-clés : Adriatique orientale, céramique Impressa, Dalmatie, Épigravettien, lame par pression au levier, lithique, site de plein air.

INTRODUCTION

The prehistoric site of Konjevrate-Groblje is situated next to a natural pond in the village of Konjevrate, 10 km northeast of Šibenik in Dalmatia, Croatia (fig. 1, fig. 2 and fig. 3). The major part of the site is covered by the Medieval/modern St John's church and graveyard; therefore it is inaccessible to archaeologists and likely severely damaged. Archaeological excavations were conducted at the site's southern edge in several campaigns during the 1980s and 1990s. In preliminary reports, the site had been interpreted as a single-phase Impressed Ware open-air village (Mendušić, 1990, 1998, 1999 and 2005; Podrug, 2013). However, a recent systematic study of the archived assemblage, followed by a new excavation, showed the site's chronology to be much more complex than initially proposed.

1. HISTORY OF THE RESEARCH

The site of Konjevrate-Groblje was discovered in 1988. Local vicar friar Milan Ujević informed the Šibenik City Museum of pottery fragments found during a grave construction at the Konjevrate graveyard. In the same year, archaeologists opened a small test trench measuring 2.5 m × 2.5 m (fig. 3, A) that showed an intact cultural layer with an abundance of Impressed Ware pottery. In the next two years, three joint trenches labeled I, II and III were subsequently opened, eventually forming a unit measuring 8 m × 8 m (fig. 3, nos. I to III). This unit yielded a segment of a large pit of the irregular ground plan (or possibly a cluster of multiple intersected pits; fig. 4). After a considerable pause, exca-

vation at Konjevrate was restarted for a single campaign in 1998. Adjacent to the area excavated in 1989-1990, a set of five joint trenches labeled IV to VIII formed a unit measuring c. 10 m × 8 m (fig. 3, nos. IV to VIII). No further pits or other features were found, and compared to the previously researched area, this unit yielded a much smaller pottery assemblage, but a considerably larger number of lithic artifacts (c. 4,000 pieces). In the same campaign, another two units were opened and labeled IX (5 m × 2.5 m) and X (3 m × 2 m); however, due to the lack of precise descriptions in the excavation documentation, their locations can only be approximated (fig. 3, nos. IX and X). Unit IX yielded some chert artifacts, and unit X was archaeologically sterile.

These five spatially separated units that were excavated during the 1988, 1989, 1990 and 1998 campaigns in the south part of the site measured total c. 170 m². Methodologically, the excavation was done in a conservative manner, using 15 cm-25 cm thick arbitrary "layers". The collected assemblages and the excavation documentation is stored in the Šibenik City Museum (Šibenik, Croatia) and was not analyzed until 2014. In the preliminary reports of the excavation results, the site was interpreted as a Neolithic Impressed Ware open-air settlement with remains of a pit dwelling and a chert workshop located adjacent to it (Mendušić, 1990, 1998, 1999 and 2005).

2. ASSEMBLAGE REVISITED

In the past decade, a standard systematic curator's review of the Šibenik City Museum's Prehistoric collection was conducted with the aim to ascertain artifacts' state of preservation and to select the assemblages that had not yet been studied (Konjevrate-Groblje, among others).



Fig. 1 – Map location of Konjevrate.

Fig. 1 – Carte de localisation de Konjevrate.

The subsequent research work confirmed that the whole Konjevrate pottery assemblage is from the Early Neolithic Impressed Ware phase (Korić and Horvat, 2018). This was further corroborated by radiocarbon dates that dated the pit feature to the first quarter of the 6th millennium BC, *i.e.* within the first half of the Impressed Ware phase (table 1). However, several of the radiocarbon dates also suggested a longer occupational sequence at Konjevrate, dating to at least until the second half of the millennium⁽¹⁾.

A more complex occupation sequence was further suggested by the interdisciplinary analysis of the large

lithic assemblage. The lithic assemblage was studied for the first time in 2014 in the framework of a PhD thesis (Kačar, 2019a). The material from all the excavation campaigns (1988, 1989, 1990 and 1998) was examined, but only the material from the first three campaigns was analyzed and published within the aforementioned thesis. The Konjevrate assemblage, which counts more than 4,000 pieces and weighs more than 40 kg, is dominated by cortical flakes and debris, flakes from the early stage of reduction, opening flakes and cores.

Concurrently, the entire lithic material from Konjevrate was examined from a petro-archaeological point of



Fig. 2 – The church, graveyard and the pond in the village of Konjevrate (view from the southeast; photo N. Triozzi).

Fig. 2 – L'église, le cimetière et l'étang du village de Konjevrate (vue du sud-est ; cliché N. Triozzi).



Fig. 3 – Ortophoto of the Konjevrate-Groblje site (photo N. Triozzi). Red: Units excavated in 1988 (A), 1989-1990 (I-III) and 1998 (IV-VIII, and approximate locations of IX and X). Yellow: Units excavated in 2018 (XI and XII). Green: Prehistoric grave found in 1979 (B). Blue: Surface finds in 2018 (C: Danilo potsherd; D: chert).

Fig. 3 – Ortophotographie du site de Konjevrate-Groblje (cliché N. Triozzi). Rouge : unités fouillées en 1988 (A), 1989-1990 (I-III) et 1998 (IV-VIII, et localisations approximatives de IX et X). Jaune : unités fouillées en 2018 (XI et XII). Vert : sépulture préhistorique découverte en 1979 (B). Bleu : artefacts découverts en surface en 2018 (C : tesson Danilo ; D : chert).

view within the framework of another PhD thesis (Perhoč, 2020; the analyses included macro and microscopic characterization of lithic types).

The assemblage shows surprising diversity of raw materials used in lithic production as well as variability in their exploitation (fig. 5 and fig. 6). Such economy indicates different management of raw materials, and in this sense, four main *chaînes opératoires* can be singled out



Fig. 4 – Pit feature(s) in the 1989-1990 unit (photo M. Menđušić).

Fig. 4 – Élément(s) de fosse dans l'unité 1989-1990 (cliché M. Menđušić).

from the 1988-1990 assemblages (Kačar, 2019a, p. 479-503). This may be summarized as follows.

The first *chaîne opératoire* consists of the use of local Eocene cherts of mediocre quality in the technologically simple (expedient) production of flakes (fig. 5, no. 6). This assemblage which is numerically the largest, also includes many natural (unworked) pieces, large cortical flakes and cores, while blades are almost absent. The second *chaîne opératoire* implies the use of local and regional Cretaceous cherts of good quality (fig. 5, nos. 1 and 4; fig. 6, nos. 1, 3 and 4) in the production of blades through the use of direct percussion. The third refers to the use of radiolarites (fig. 5, no. 5), which were collected in secondary deposits, for the production of blades and bladelets obtained by direct percussion. The fourth corresponds to the use of exogenous cherts of Gargano origin (southern Italy) for the production of blades which were principally obtained by pressure flaking (fig. 5, nos. 2 and 3). While the first (expedient production of flakes on local cherts) and the fourth (pressure-flaked blades on Gargano cherts) *chaînes opératoires* are recorded in other early Neolithic assemblages, the second and third are not represented in any other Neolithic assemblages of the region. Indeed, the archaeological record shows that local and regional raw materials, such as cherts from Upper Cretaceous limestones and radiolarites, were not used in the production of blades and bladelets in the Neolithic, but are rather characteristic of earlier periods

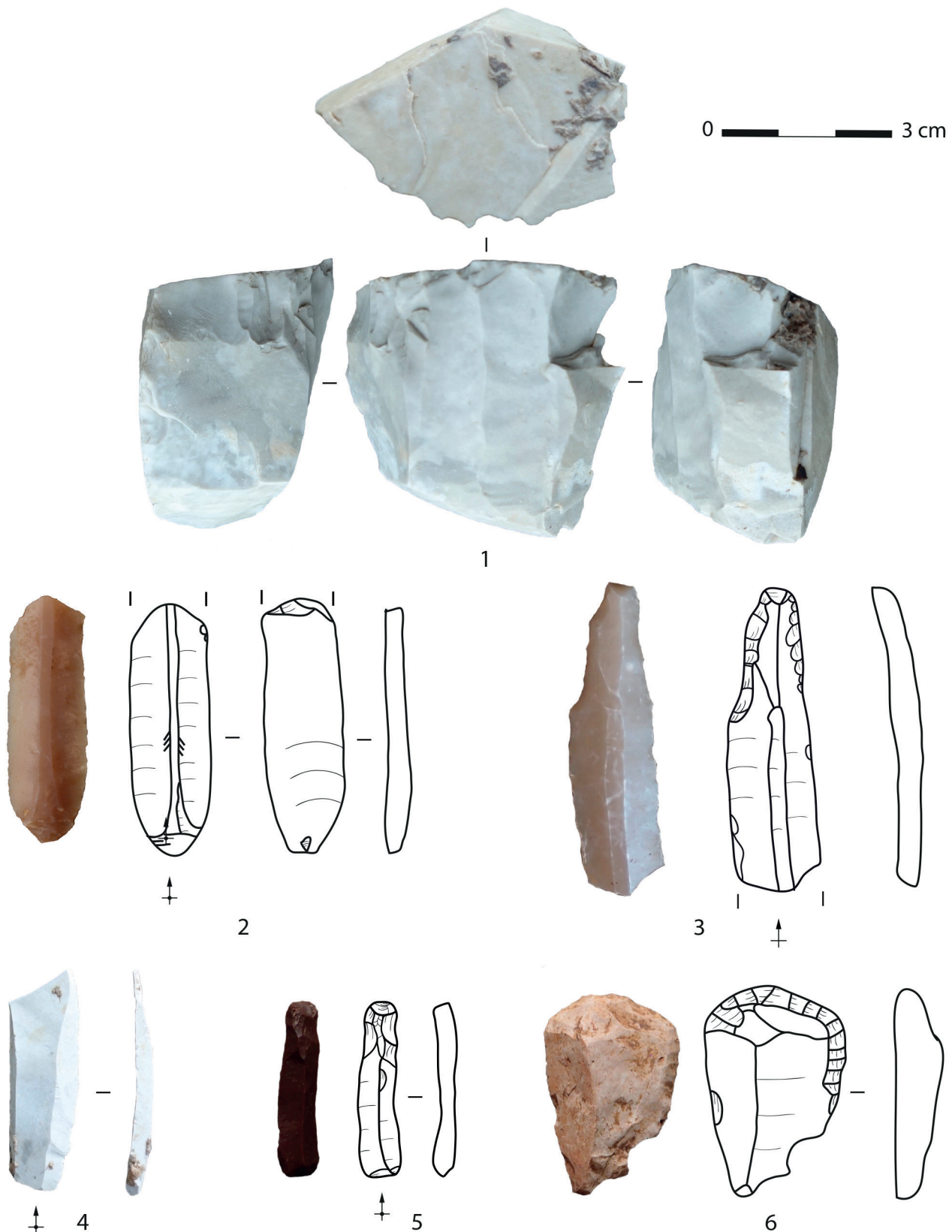


Fig. 5 – Lithic artifacts from Konjevrate (photo, drawings S. Kačar and E. Podrug). 1: Blade core (Cretaceous chert). 2: Blade made by pressure flaking (Gargano chert). 3: Blade (a drill) made by pressure flaking (Gargano chert). 4: Unretouched blade made by direct percussion (Cretaceous chert). 5: Retouched bladelet (endscraper; radiolarite). 6: Endscraper on flake (Eocene chert).

Fig. 5 – Artefacts lithiques de Konjevrate (cliché, dessins S. Kačar et E. Podrug). 1 : Nucléus à lames (silex crétacés). 2 : Lame par pression (silex du Gargano). 3 : Lame (un perceur) par pression (silex du Gargano). 4 : Lame non retouchée par percussion directe (silex crétacés). 5 : Lamelle retouchée (grattoir ? ; radiolarite). 6 : Grattoir sur éclat (silex éocènes).

(Vukosavljević, 2012; Vukosavljević et al., 2014, p. 31, Šošić Klindžić et al., 2015; Perhoč 2020).

Tools are mostly made on flakes (of the 72 tools, 48 were made on flakes and 24 on blades) and include common tools such as irregularly retouched flakes, endscrapers and scrapers (Kačar, 2019a, p. 492). The group of tools on blades consists mainly of irregularly retouched blades, scrapers and endscrapers and only one glossy blade. The latter refers to the diagonally hafted sickle insert, which is made by pressure flaking on Gargano chert and, as such, fits into both the strategies of lithic production and sickle management characteristic of the Dalmatian Impressed Ware culture (Mazzucco et al., 2018; Kačar, 2019a and 2019b). However, in the Early Neolithic context of Northern Dalmatia, tools are rarely made on flakes and the glossy blades are always well represented in the group of tools on blades (Kačar, 2019a and 2019b, p. 364).

Therefore, apart from the fact that during the Early Neolithic, blades were made exclusively on Gargano cherts (Forenbaher and Perhoč, 2017; Kačar, 2019a and 2019b; Perhoč, 2020), which are numerically underrepresented here, the typological and technological aspects also show that the lithic industry from Konjevrate differs from all other Dalmatian Early Neolithic assemblages.

Our hypothesis about the cultural-chronological discrepancy between lithics and pottery from Konjevrate is further supported by their spatial distribution and context: more than 95% of the pottery assemblage was collected from the fill of the pit feature excavated in 1988-1990, while in the 1998 trenches, chert was collected abundantly and the pottery finds were scarce.

During the study of the Konjevrate assemblage, several interesting accidental finds in the Konjevrate graveyard area became known to the research team.

In the 1990s, a Danilo phase ceramic rhyton's leg was allegedly found near the vicar's house⁽²⁾. Also, further back in 1979, during the construction of a family tomb, a local resident found the remains of a prehistoric grave c. 30 m east from the church (fig. 3, B). According to the description written by the finder in a letter that was delivered to the local priest along with the finds, the grave had an oval form made with large stones. Inside the grave was a crouched skeleton with several grave goods: three ceramic pots, a long chert blade and an antler tool (probably an axe or a chisel)⁽³⁾.

The chert blade (fig. 6, no. 6) is preserved completely: 25.4 cm long, 2.7 cm wide and 0.8 cm thick. Such impressive size and consistent thickness suggest that the blade was obtained by the lever-pressure technique, probably using the copper tip (dihedral butt, cracks). The blade was made from high-quality chert, probably of Gargano origin, and does not display any traces of utilization. Although the use of the lever-pressure technique has been reported in Dalmatia (Mazzucco et al., 2018; Kačar, 2019a and 2019b; Kačar and Philibert, 2022)⁽⁴⁾ and elsewhere in the central Mediterranean (southern Italy, Greece) from the Early Neolithic (Perlès, 1990 and 2001; Guilbeau, 2010 and 2011; Guilbeau and Perlès,

2019), certain elements suggest that the blade from Konjevrate is somewhat younger, *i.e.* can be attributed neither to Early Neolithic (Impressed Ware) nor to the next Neolithic phase (Danilo).

Indeed, the blade from Konjevrate does not fit into the Early Neolithic scheme either according to its morphological characteristics nor the context in which it was found. It is much longer and thinner than lever-pressure blades recorded in Dalmatia⁽⁵⁾ and in Italy (see Guilbeau and Perlès, 2019). Context-wise, a grave with items placed with the deceased as grave goods is not a common phenomenon in the Dalmatian Neolithic. The number of known (published) graves is still rather small, with just a few documented examples, and none of them so far show an undoubtable presence of grave goods (Marijanović, 1994 and 2003; Zlatunić, 2003). On the other side of the Adriatic, graves from the Early and Middle Neolithic in southern Italy are also scarce and without goods. However, the number of known graves increases towards the end of the late Neolithic. More importantly, during the part of the Late Neolithic and the Early Copper Age, *i.e.* between 4500-3500 cal BC, lever-pressure flaked long blades made on Gargano cherts were placed with the deceased (Guilbeau, 2010, p. 32 and p. 48-49). These Italian analogies imply the Konjevrate grave may belong to the late Hvar or early Nakovana pottery style period. The transition between the two pottery styles corresponds with the Neolithic-Copper Age transition around 4000 cal BC in the chronological scheme of the Eastern Adriatic area (Forenbaher et al., 2013).

3. SITE REVISITED: TESTING THE PROPOSED SCHEME

The study of the Konjevrate finds stored in the museum, as well as the reported accidental finds in the graveyard area, suggested the site had a more complex chronological situation than had previously been interpreted. The properties of the lithic material pointed to its cultural and chronological discrepancies to the pottery and suggested that the excavated segments of the site comprised at least two separate prehistoric periods.

In order to test the newly proposed cultural-chronological scheme of the site, a revision excavation was conducted in 2018 (Podrug and Kačar, 2018). The two opened units were labeled XI and XII (fig. 3, XI and XII).

Unit XII (2 m × 1 m) was placed a bit further west from the Konjevrate graveyard following an oral report of the accidental ceramic rhyton find, but the unit proved to be archaeologically sterile.

Unit XI was placed at the western edge of the graveyard, close to the previously excavated area. It was L-shaped and 25.5 m² large, with its longer sides measuring 6 m × 6 m. Due to the lack of time, the excavation was completed to the sterile subsoil only in the eastern part of the unit, *i.e.* in its eastern 16.5 m² (fig. 7 and fig. 8). At the top of the stratigraphy, there were two archaeologi-

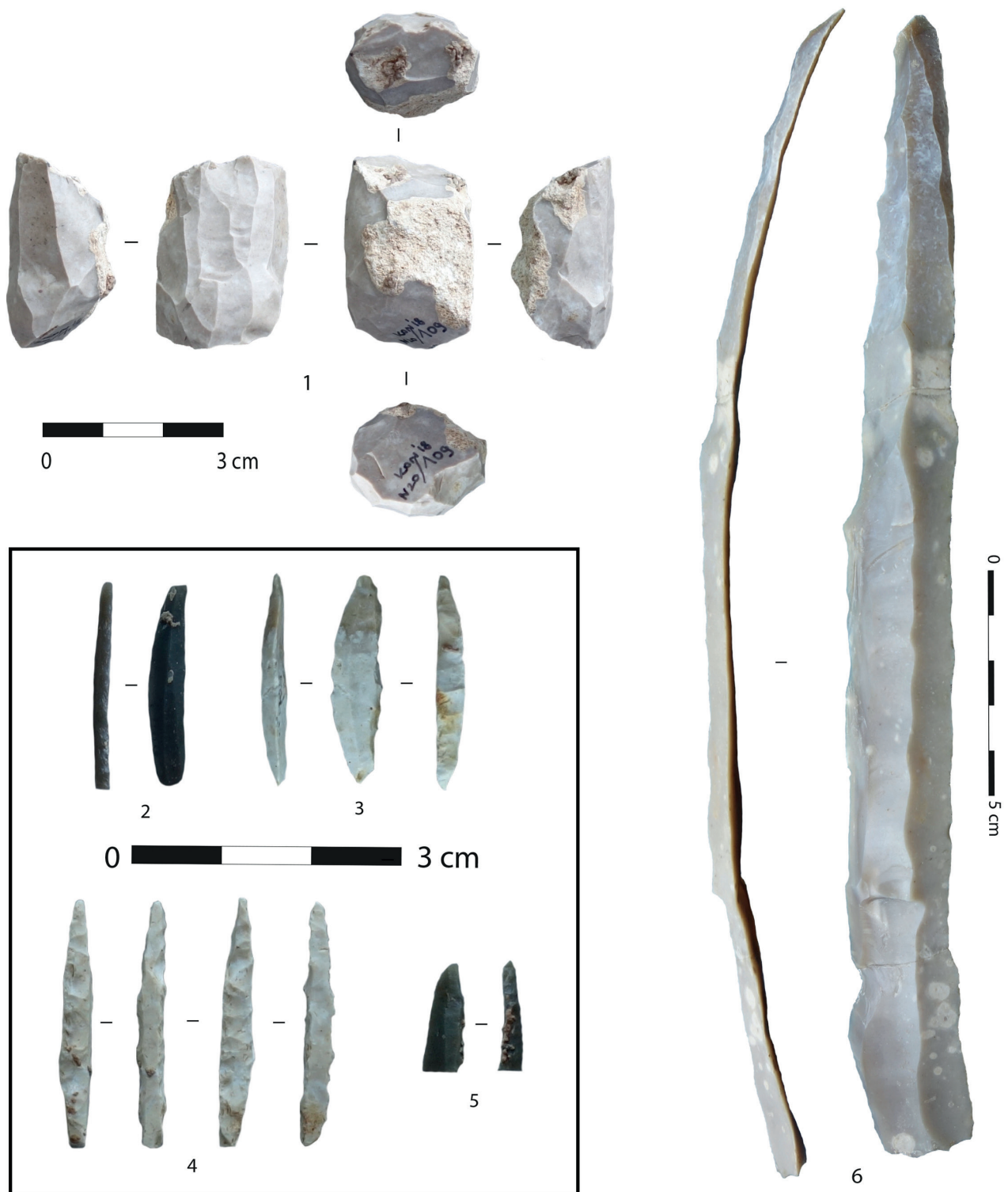


Fig. 6 – Lithic artifacts from Konjevrate (photo S. Kačar and E. Podrug). 1: Blade(let) core (Cretaceous chert). 2: Backed bladelet (Cretaceous chert). 3: Backed point (undetermined chert). 4: Backed point (Cretaceous chert). 5: Backed point (undetermined chert). 6: Long blade made by lever-pressure flaking (Gargano chert).

Fig. 6 – Artefacts lithiques de Konjevrate (clichés S. Kačar and E. Podrug). 1 : Nucléus à lame(ille)s (silex crétacés). 2 : Lamelle à dos (silex crétacés). 3 : Pointe à dos (silex indéterminé). 4 : Pointe à dos (silex crétacés). 5 : Pointe à dos (silex indéterminé). 6 : Grande lame par pression au levier (silex du Gargano).

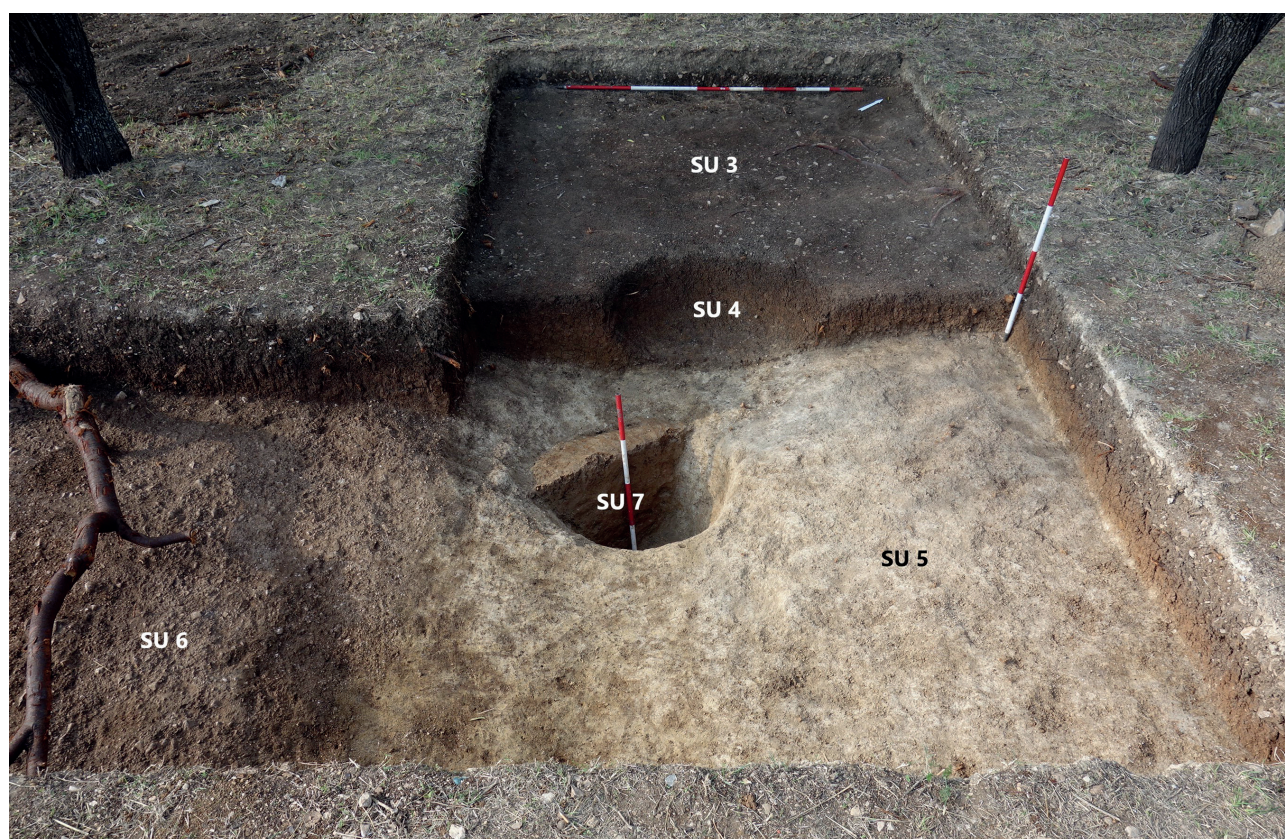


Fig. 7 – Unit XI at the end of the 2018 excavation campaign (photo E. Podrug).

Fig. 7 – Unité XI à la fin de la campagne de fouilles 2018 (cliché E. Podrug).

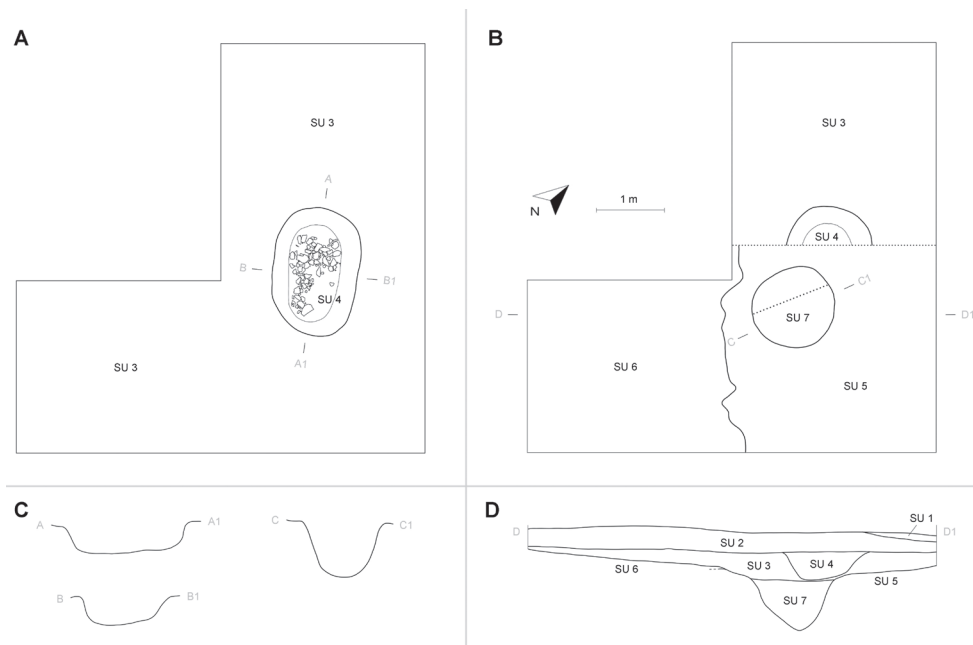


Fig. 8 – Excavation unit XI (drawing J. Jović, M. Rak, E. Podrug). A: Pit SU 4. B: Top of the layer SU 3 (in NW part of the unit); top of the pre-subsoil SU 6 and subsoil SU 5 with the pit SU 7. C: Cross-sections of the pits SU 4 and SU 7. D: Cross-section of the unit XI stratigraphy.

Fig. 8 – Unité de fouille XI (dessin J. Jović, M. Rak, E. Podrug). A : Fosse SU 4. B : Sommet de la couche SU 3 (dans la partie NW de l'unité) ; sommet du pré-sous-sol SU 6 et du sous-sol SU 5 avec la fosse SU 7. C : Coupes transversales des fosses SU 4 et SU 7. D : Coupe transversale de l'unité XI.

cally sterile layers: SU1 (yellowish clayish subsoil dislocated to the surface from the nearby modern graves) and SU2 (dark brown topsoil humus), with “SU” standing for “stratigraphic unit”. Further below, there was a very hard and compact brown soil layer, SU3. At the top of it, there was a pit with an oval ground plan (SU4; fig. 9), whose dark brown soil fill contained Neolithic Impressed Ware pottery (fig. 10, A), animal bones and a few lithics. The pit bottom was partly covered with stones and a thin layer of burnt soil. The SU3 layer, however, showed a completely different finds assemblage marked with an abundance of chert artifacts and an almost complete lack of any other kind of artifact. The absence of ceramic finds, taken together with the main characteristics of the lithic industry (blades and bladelets made by direct percussion on regional cherts) led us to attribute this layer to the Upper Paleolithic, while the presence of backed bladelets, backed points and circular endscrapers, when placed in the broader context of central Mediterranean Prehistory, support its link to the Epigravettian techno-complex (fig. 5, no. 6; fig. 6, nos. 2, 3, 4 and 5)⁽⁶⁾.

The thickness of this intact layer varied from 5 cm to 45 cm, due to the slope of the pre-subsoil (SU6) and subsoil (SU5) that lay below it. Another feature was a pit (SU7) dug down from the top of the subsoil (fig. 7 and



Fig. 9 – Early Neolithic pit SU 4 (photo E. Podrug).

Fig. 9 – Fosse du Néolithique ancien SU 4 (cliché E. Podrug).



Fig. 10 – Pottery from Konjevrate (photo E. Podrug). A: Impressed Ware potsherds from the excavation unit XI.
B: Danilo potsherd found near the pond.

*Fig. 10 – Poterie de Konjevrate (cliché E. Podrug). A : Les tessons Impressa de l'unité de fouille XI.
B : Tessons de Danilo trouvés près de l'étang.*

fig. 8). Its fill was very similar to the SU3 layer, except it was even harder and had a somewhat lower chert density.

The revision excavation at Konjevrate-Groblje showed a clear stratigraphical distinction between the two occupation episodes. The SU3 layer and the pit SU7 hold remains of the Late Upper Paleolithic occupation, while the Early Neolithic settlement is preserved only with a pit feature SU4 that was dug into the layer SU3.

During the 2018 excavation, a wide area around the site was surveyed, and many surface finds were collected. Distribution of chert artifacts shows that the site extends to the west of the pond as well (fig. 3, D). Also important was the surface find of a ceramic bowl wall-sherd decorated with a typical Danilo style (second half of the 6th millennium BC) incised spiral design (fig. 3, C; fig. 10, B).

4. DISCUSSION

Although still in its preliminary stages, so far the study of the Konjevrate-Groblje site's stratigraphy and finds shows the following occupation sequence. The earliest occupation debris is from the Late Upper Paleolithic and is preserved with a pit and up to 45 cm thick layer (labeled SU3 in the 2018 excavation) above it, both containing a large density of the Epigravettian lithic industry artifacts⁽⁷⁾. This layer can also be seen in

the trench profiles on the 1988-1990/1998 site photos (fig. 11), but at the time it was not documented as a separate layer.

The Epigravettian context was overwhelmingly dominated by chert artifacts, thousands of lithics vs a few objects of other materials (a few small bones and seashell fragments), which cannot be explained solely by taphonomic factors, such as acidity of soil. Although preliminary, the micromorphological examination of the cross-section of the SU3 layer indicates the absence of almost any organic finds in this relict soil. Therefore, the fact that there is no evidence for other types of occupation activities, taken together with the angularity, the smooth surface, and the prominent and regular boundary of common chert fragments (Katarina Gerometta, pers. comm.) all suggest this location was possibly used with a specific purpose, likely centered on chert-related activities. Indeed, lithic elements dominated by cortical flakes and debris, flakes from the early stages of reduction, opening flakes and cores imply that the chert was exhaustively exploited and that the site (or at least its excavated portion) could be interpreted as a chert working area. Regarding the high number of chert pieces, including "natural" unworked nodules, it is possible that some chert sources are situated in the vicinity of the site. According to Z. Perhoč, most of the chert is of local origin (Perhoč, 2020, p. 130-131). Non local raw materials are represented only in very small quantities, including Scaglia Rossa cherts from the Marche region (1.5% of total raw materials; here fig. 12a



Fig. 11 – Excavation of the trench VIII in 1998 (photo M. Mendušić): arrows point to the brown layer (between topsoil humus and sterile subsoil) which corresponds to layer SU 3 from the 2018 excavation.

Fig. 11 – Fouille du sondage VIII en 1998 (cliché M. Mendušić) : les flèches pointent vers la couche brune (entre humus de la couche arable et sous-sol stérile) qui correspond à la couche SU 3 de la fouille de 2018.

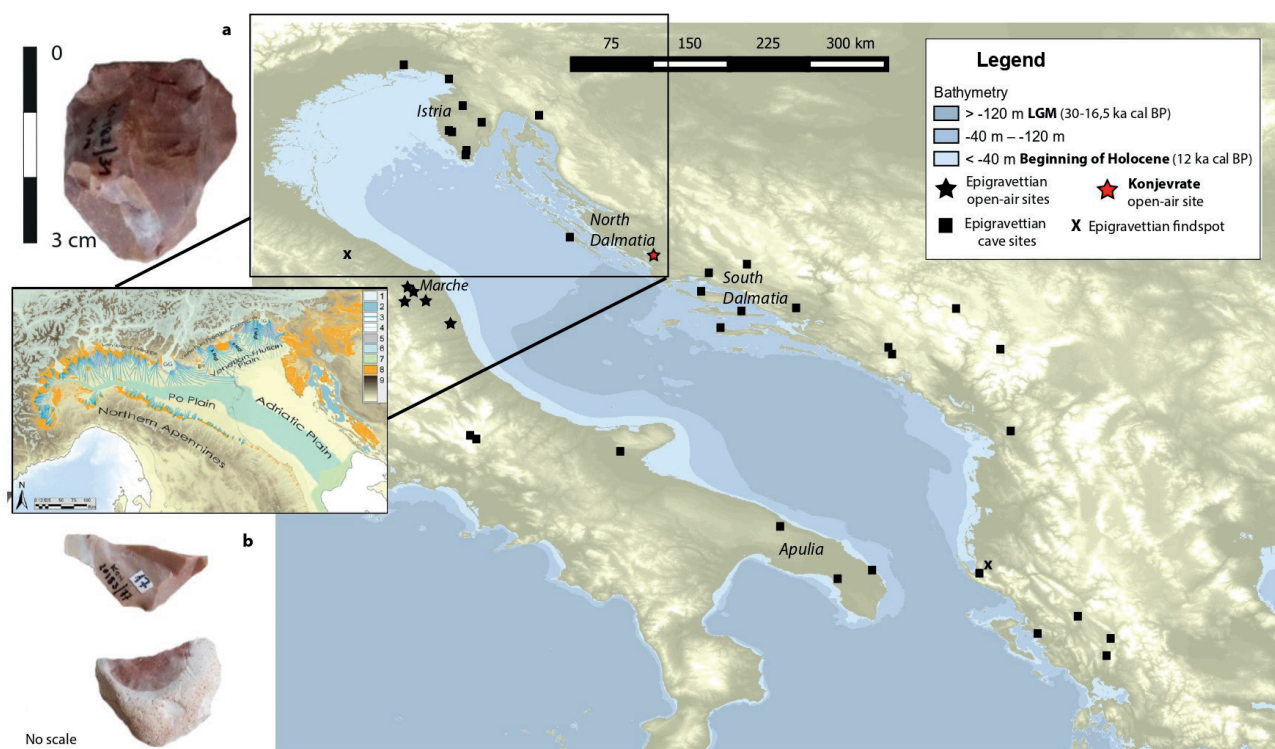


Fig. 12 – Adriatic region, geographic position of the study area in relation to the post-glacial sea level rise. The -40 m – -120 m bathymetric contour (blue shading) depicts the hypothetical position of coastlines at ca. 18,5 ka BP (base map G. Roguet). Small map: Palaeogeographic map of the Great Adriatic-Po Region depicting the Great Adriatic plain of the Last Glacial Maximum (Peresani et al., 2021 p. 131, fig. 2). Figures a and b: Konjevrate lithic finds, cherts of Marche origin (central Italy; according to Z. Perhoč, pers. comm.; photos S. Kačar and E. Podrug).

Fig. 12 – La région adriatique, position géographique de la zone d'étude par rapport à l'élévation post-glaciaire du niveau de la mer. Le contour bathymétrique de -40 m à -120 m (ombrage bleu) représente la position hypothétique des côtes à env. 18,5 ka BP (fond de carte G. Roguet). Petite carte : carte paléogéographique de la région de la Grande Adriatique-Pô représentant la grande plaine adriatique du dernier maximum glaciaire (Peresani et al., 2021, p. 131, fig. 2). Figures a et b : pièces lithiques de Konjevrate, silex provenant des Marches (Italie centrale ; selon Z. Perhoč, comm. pers. ; clichés S. Kačar et E. Podrug).

and 12b; Perhoč, 2020, p. 130-131 and p. 421-423). The presence of Marche cherts could indicate Epigravettian networks and/or territories covered by hunter-gatherer groups that inhabited the Adriatic region. To this end, it is important to keep in mind that at the end of the Last Glacial Maximum, the Adriatic had a considerably different outline to what it is today. Namely, the northern half of today's Adriatic Sea was covered by a vast plain (= Great Adriatic Plain; fig. 12). Due to the quasi absence of organic material, the Epigravettian occupation has not yet been radiocarbon dated.

The Konjevrate site thus falls within a rather rare category of known open-air Epigravettian sites in the area (here fig. 12; Karavanić, 2017; Tomasso et al., 2020; Peresani et al., 2021; Ruiz Redondo et al. 2022).

The next occupation episode documented in the excavations dates to the early Neolithic. Unlike the earlier occupation, this occupation is not preserved with an actual layer but with pit features. The lack of a cultural layer is probably the result of the surface erosion processes combined with agricultural activity. The early Neolithic pits are dug into the Epigravettian layer and the underlying sterile subsoil. Their fills are abundant with Impressed Ware pottery and animal bones, but the lithics

are scarce. The beginning of the Neolithic in the Eastern Adriatic is dated to c. 6000 cal BC and is associated with the appearance of pots decorated with rows of simple impressed motifs. The Impressed Ware pottery style in Dalmatia lasted for 500-600 years and was replaced with the Danilo style (Forenbaher et al., 2013; McClure et al., 2014). Radiocarbon dates from the Impressed Ware context at Konjevrate cover most of the first half of the 6th millennium BC.

The Danilo phase (second half of the 6th millennium BC) occupation at Konjevrate has been detected only based on a few dislocated and surface finds: a dated bone (table 1, sample KON-4), a potsherd with the typical Danilo incised design (fig. 10, B), and an alleged find of a ceramic rhyton fragment; and has yet to be confirmed stratigraphically in the excavation.

The latest so far determined prehistoric occupation at Konjevrate is represented by a grave found in 1979. Ceramic pots that were placed with the crouched skeleton might have been helpful to date the grave to a specific chronological phase, but unfortunately, because of their poor state of conservation, sherds were not collected by the finder. Based on the presence of a long blade made by lever-pressure flaking in the funeral context (fig. 6, no. 6)

Sample code	Lab. sample code	Material	Archaeological context/campaign	Date BP	Date 2σ cal BC	Reference
KON-2	UCIAMS-116203/ PSU-5291	Bone (<i>Ovis aries</i>)	O. s. I/1988	6655 ± 25	5631-5525	McClure <i>et al.</i> , 2014 and 2018
KON-4	UCIAMS-119838/ PSU-5557	Bone (<i>Ovis aries</i>)	O. s. III/1988	6175 ± 30	5215-5016	McClure <i>et al.</i> , 2014 and 2018
KON-8	PSUAMS-1431	Bone (<i>Bos taurus</i>)	III – O. s. IV/1990	6985 ± 30	5980-5771	McClure <i>et al.</i> , 2018
KON-9B	PSUAMS-1432	Bone (large mammal)	O. s. VIII/1988	6950 ± 45	5973-5732	McClure <i>et al.</i> , 2018
KON-10	PSUAMS-1433	Bone (<i>Capra hircus</i>)	O. s. VII/1988	7000 ± 30	5983-5793	McClure <i>et al.</i> , 2018

Table 1 – Radiocarbon dates calibrated with OxCal v4.4.4 (Bronk Ramsey, 2021); r:5 and IntCal 20 atmospheric curve (Reimer *et al.*, 2020).

Tableau 1 – Dates radiocarbones calibrées avec OxCal v4.4.4 (Bronk Ramsey 2021) ; r:5 et la courbe de calibration IntCal 20 (Reimer *et al.*, 2020).

and correlated to the chronological frame suggested by Italian finds, we propose that Konjevrate grave dates to the late Hvar or early Nakovana pottery style period, i.e. c. 4500-3500 cal BC.

CONCLUSION

Although still in its preliminary stage, the study of the Konjevrate-Groblje assemblage and the new excavation show that the site was occupied during multiple prehistoric phases. It was first used during the Late Upper Paleolithic as a chert-working area. After a long pause, it was occupied in the early Neolithic, probably as a settlement. Several later sporadic finds provide glimpses into the later Neolithic and possibly early Copper Age episodes of occupation, but without further excavation, it is impossible to say if it was continuous throughout all these periods. This scheme differs very much from the initial interpretations of the site's type and chronology outlined in the earlier excavation reports.

The case of the Konjevrate-Groblje site serves as a good example of the importance of revisiting archaeological assemblages in the museum collections, especially those that were not intensively analyzed nor published. Given the high level of specialization of researchers' expertise in archaeology today, revisiting old assemblages can shed new light on the sites' complexities and importance. The study of the Konjevrate lithic assemblage, followed by a new excavation, transformed this site into an exceptional example of an open-air location with both Upper Paleolithic and Neolithic occupation sequences present within the same trenches. It also put the first excavated open-air Epigravettian site on the Eastern Adriatic on the map and clearly showed that the absence of evidence can sometimes be resolved by revisiting old assemblages. Another excellent example is the Žukovica cave on the island of Korčula, where revisiting finds and site led to a deeper understanding of the stratigraphy and assemblage, enhancing their complexity and importance (Forenbaher *et al.*, 2020). Recently, careful excavation and the involvement of specialists enabled the discovery

of the first known Castelnovian occupation in Dalmatia (Vukosavljević and Perhoč, 2020), confirming that the former absence of the Castelnovian along the Croatian littoral (Kozłowski, 2009) was simply due to the lack of comprehensive research efforts (Kačar, 2020). Following these studies, there is no doubt that there will be many more such discoveries in the near future.

Acknowledgements: We would like to thank two anonymous reviewers for their thoughtful comments and efforts towards improving our manuscript, and editors for their suggestions, guidance and patience. Special thanks to S. McClure, K. Gero-metta, M. Mendušić, Z. Perhoč, H. Šindilj, B. Grečić, J. Jović, D. Vidas, R. Connolly and B. Čurčija for their assistance during the research. The excavation was supported by the Croatian Ministry of Culture and Media and the Šibenik City Museum and we thank them for that. We dedicate this paper to the late friar Milan Ujević who discovered the Konjevrate site and to whom we are indebted for being the rescuer of cultural heritage and a great collaborator to archaeologists and curators.

FOOTNOTES

- (1) The three earliest radiocarbon dates were made on the samples from the bottom arbitrary layers of the 1988 test trench and the 1990 trench III, i.e. the bottom of the large pit (table 1, samples KON-8, KON-9B, KON-10). The next sample was selected from the top of the pit fill and its date corresponds to the late Impressed Ware phase (table 1, sample KON-2). The last dated sample chronologically fits within the next Neolithic phase-Danilo (table 1, sample KON-4). Given the fact that no Danilo style pottery was found in the excavation, two solutions were given for this occurrence: either some nearby part of the site was occupied during the second half of the 6th millennium BC, or this date may actually reflect a longer continuity of an Impressed Ware pottery style tradition in some areas or sites (McClure *et al.*, 2014). When taken into account that the sample KON-4 was selected from one of the disturbed topsoil arbitrary layers of the 1988 test unit, the first proposed solution: a Danilo phase bone being found in its secondary context, would be a more likely scenario. For the chrono-

logy of the Neolithic pottery styles see: Forenbaher et al., 2013; McClure et al., 2014.

- (2) The rhyton's leg was not turned in and is evidenced only by personal communications with the finder. The reported position of the find was tested with a small trench (labeled XII) in 2018, that turned out to be archaeologically sterile.
- (3) Unfortunately, the pottery finds were not collected by the finder due to their poor state of preservation. The chert blade and the antler artifact are stored in the museum collection of the Franciscan monastery on the island of Visovac. We thank S. Vitezović for the preliminary identification of the antler tool.
- (4) It is, however, possible that some of these large blades (> 20 mm) were obtained by forced abdominal pressure (Kačar and Philibert, 2022).
- (5) Yet a couple of morphologically similar long and narrow blades were recorded at the eponymous single-phase middle Neolithic site of Danilo (Korošec, 1958, T. LIX, nos. 5 and 6).
- (6) The lithic assemblage is currently under study and the results will be published elsewhere together with results obtained from soil micromorphology, ceramics, archaeozoological and archaeobotanical data.
- (7) The average density of chert artifacts for the SU3 is c. 1,200 pieces per cubic meter. Artifacts were distributed throughout its whole volume, from the top to the base of this layer.

Sonja KAČAR

Austrian Archaeological Institute of the
Austrian Academy of Sciences, Vienna, Austria
sonja.kacar@gmail.com

Emil PODRUG

Šibenik City Museum, Šibenik, Croatia
emil.podrug@gmail.com

REFERENCES

- BRONK RAMSEY C. (2021) – *OxCal 4.4.4*, <http://c14.arch.ox.ac.uk/oxcal>.
- FORENBAHER S., KAISER T., MIRACLE P. T. (2013) – Dating the East Adriatic Neolithic, *European Journal of Archaeology*, 16, 4, p. 589-609.
- FORENBAHER S., PERHOČ Z. (2017) – Lithic Assemblages from Nakovana (Croatia). Raw Material Procurement and Reduction Technology from the Early Neolithic until the End of Prehistory, *Journal of Mediterranean Archaeology*, 30, 2, p. 189-211.
- FORENBAHER S., RADIĆ D., MIRACLE P. T. (2020) – *Špilja Žukovica na Korčuli: rezultati istraživanja 2013.-2014.*, Sv. 1 *Neporemećeni slojevi neolitika i mezolitika*, Vela Luka, Centar za kulturu, 101 p.
- GUILBEAU D. (2010) – *Les grandes lames et les lames par pression au levier du Néolithique et de l'Énéolithique en Italie*, PhD Dissertation, vol 1, University Paris Ouest Nanterre-La Défense, Nanterre, 253 p.
- GUILBEAU D. (2011) – Le début du Néolithique en Italie méridionale : ce que nous disent les productions en silex du Gargano, *Origini*, 33, 5, p. 83-106.
- GUILBEAU D., PERLÈS C. (2019) – Please Help Us Find the Origins of Greek and Italian Early Neolithic Lever Pressure-Flaking!, in L. Astruc, C. McCartney, F. Briois and V. Kassianidou (eds.), *Near Eastern Lithics on the Move: Interactions and Contexts in Neolithic Traditions*, Proceedings of the 8th International Conference on PPN Chipped and Ground Stone Industries of the Near East (Nicosia, November 23rd-27th 2016), Nicosia, Astrom Editions, p. 511-518.
- KAČAR S. (2019a) – *Les sociétés mésolithiques de l'arc adriatique oriental : des origines à la néolithisation, de l'Istrie aux côtes épirotes*, PhD Dissertation, vol. 1, University Toulouse 2 Jean-Jaurès, Toulouse, University of Zagreb, Zagreb, 612 p.
- KAČAR S. (2019b) – Impressed Ware Blade Production of Northern Dalmatia (Eastern Adriatic, Croatia) in the Context of Neolithisation, *Documenta Praehistorica*, 46, p. 352-374.
- KAČAR S. (2020) – Evidence of Absence or Absence of Evidence? Searching for Late Mesolithic (Castelnovian) Hunter-Gatherers in the Eastern Adriatic, *Journal of Mediterranean Archaeology*, 33, 2, p. 160-184.
- KAČAR S., PHILIBERT S. (2022) – Early Neolithic Large Blades from Crno Vriilo (Dalmatia, Croatia): Preliminary Techno-Functional Analysis, *Open Archaeology*, 8, p. 256-272.
- KARAVANIĆ I. (2017) – *Paleolitički lovci skupljači na tlu Hrvatske*, Zagreb, Matica Hrvatska, 171 p.
- KORIĆ M., HORVAT K. (2018) – The Typological and Stylistic Characteristics of the Early Neolithic Pottery Found in Konjevrate, *Diadora*, 32, p. 7-34.
- KOROŠEC J. (1958) – *Neolitska naseobina u Danilu Bitinju. Rezultati istraživanja u 1953. godini*, Zagreb, Jugoslavenska akademija znanosti i umjetnosti, 330 p.
- KOZŁOWSKI S. K. (2009) – *Thinking Mesolithic*, Oxford, Oxbow Books, 380 p.
- MARIJANOVIĆ B. (1994) – Neki aspekti pokapanja u neolitiku Dalmacije, *Radovi Filozofskog fakulteta. Razdio povijesnih znanosti*, 30, 20, 1993-1994, p. 1-14.
- MARIJANOVIĆ B. (2003) – Crno Vriilo – novi grob starijeg neolitika u Dalmaciji, *Opuscula archaeologica*, 27, p. 37-41.
- MAZZUCCO N., GUILBEAU D., KAČAR S., PODRUG E., FORENBAHER S., RADIĆ D., MOORE A. (2018) – The Time Is Ripe for a Change: The Evolution of Harvesting Technologies in Central Dalmatia During the Neolithic Period (VIth millennium cal BC), *Journal of Anthropological Archaeology*, 51, p. 88-103.
- MCCLURE S. B., PODRUG E., MOORE A. M. T., CULLETON B. J., KENNETT D. J. (2014) – AMS ¹⁴C Chronology and Ceramic Sequences of Early Farmers in the Eastern Adriatic, *Radiocarbon*, 56, 3, p. 1019-1038.
- MCCLURE S. B., PODRUG E., KENNETT D. J. (2018) – *Radiocarbon Dates from Konjevrate, Croatia. Dataset*, <https://doi.org/10.18113/S1SS77>
- MENDUŠIĆ M. (1990) – Konjevrate: ranoneolitičko naselje, *Arheološki pregled*, 29, 1988, p. 46.
- MENDUŠIĆ M. (1998) – Neolitička naselja na šibensko-drniškom području, in *Područje Šibenske županije od pretpovijesti do srednjeg vijeka. Znanstveni skup, Šibenik, 18-20. X. 1995.*, *Izdanja Hrvatskog arheološkog društva*, 19, p. 47-62.
- MENDUŠIĆ M. (1999) – Konjevrate: istraživanje neolitičkoga naselja, *Obavijesti Hrvatskog arheološkog društva*, 30, 3, 1998, p. 52-54.
- MENDUŠIĆ M. (2005) – Pretpovijesna arheološka topografija prostora župa Konjevrate i Mirlović Zagora, in *Konjevrate i Mirlović Zagora: župe Šibenske biskupije. Zbornik radova Znanstvenog skupa Sela šibenskog zaleđa župa Konjevrate i Mirlović Zagora u prošlosti, Šibenik, 14.-16. studenoga 2002.*, p. 85-101.
- PERESANI M., MONEGATO G., RAVAZZI C., BERTOLA S., MARGARITTO D., BREDA M., ZERBONI A. (2021) – Hunter-Gatherers across the Great Adriatic-Po Region during the Last Glacial Maximum: Environmental and Cultural Dynamics, *Quaternary International*, 581, p. 128-163.
- PERHOČ Z. (2020) – *Rohmaterial für die Produktion von Steinartefakten im Spätjungpaläolithikum, Mesolithikum und Neolithikum Dalmatiens (Kroatien)*, PhD Dissertation, University of Heidelberg, Heidelberg, 616 p.
- PERLÈS C. (1990) – L'outillage de pierre taillée néolithique en Grèce : approvisionnement et exploitation des matières premières, *Bulletin de correspondance hellénique*, 114, 1, p. 1-42.
- PERLÈS C. (2001) – *The Early Neolithic in Greece*, Cambridge, Cambridge University Press, 372 p.
- PODRUG E. (2013) – Neolithic Immovable Finds in the Šibenik Area, *Diadora*, 26-27, 2012-2013, p. 185-211.
- PODRUG E., KAČAR S. (2018) – Lokalitet: Konjevrate – Groblje, excavation report, *Hrvatski arheološki godišnjak*,

- 15/2018, Ministarstvo kulture Republike Hrvatske, Zagreb (p. 724-726).
- REIMER P. J., AUSTIN W. E. N., BARD E., BAYLISS A., BLACKWELL P. G., BRONK RAMSEY C., BUTZIN M., CHENG H., EDWARDS R. L., FRIEDRICH M., GROOTES P. M., GUILDERSON T. P., HAJDAS I., HEATON T. J., HOGG A. G., HUGHEN K. A., KROMER B., MANNING S. W., MUSCHELER R., PALMER J. G., PEARSON C., VAN DER PLICHT J., REIMER R. W., RICHARDS D. A., SCOTT E. M., SOUTHON J. R., TURNEY C. S. M., WACKER L., ADOLPHI F., BÜNTGEN U., CAPANO M., FAHRNI S. M., FOGTMANN-SCHULZ A., FRIEDRICH R., KOHLER P., KUDSK S., MIYAKE F., OLSEN J., REINIG F., SAKAMOTO M., SOOKDEO A., TALAMO S. (2020) – The IntCal20 Northern Hemisphere Radiocarbon Age Calibration Curve (0-55 cal kBP), *Radiocarbon*, 62, p. 725-757.
- RUIZ-REDONDO A., VUKOSAVLJEVIĆ N., TOMASSO A., PERESANI M., DAVIES W., VANDER LINDEN M. (2022) – Mid and Late Upper Palaeolithic in the Adriatic Basin: Chronology, Transitions and Human Adaptations to a Changing Landscape, *Quaternary Science Reviews*, 276, 107319.
- ŠOŠIĆ KLINDŽIĆ R., RADOVIĆ S., TEŽAK-GREGL T., ŠLAUS M., PERHOČ Z., ALTHERR R., HULINA M., GEROMETTA K., BOSCHIAN G., VUKOSAVLJEVIĆ N., AHERN J. C. M., JANKOVIĆ I., RICHARDS M., KARAVANIĆ I. (2015) – Late Upper Paleolithic, Early Mesolithic and Early Neolithic from the Cave Site Zemunica near Bisko (Dalmatia, Croatia), *Eurasian Prehistory*, 12, 1-2, p. 3-46.
- TOMASSO A., SERRADIMIGNI M., RICCI G., MIHAILOVIĆ D. (2020) – Lost in Transition: Between Late Pleistocene and Early Holocene around the Adriatic, *Quaternary International*, 564, p. 3-15.
- VUKOSAVLJEVIĆ N. (2012) – *Organizacija litičke proizvodnje lovačko-sakupljačkih zajednica na prijelazu iz pleistocena u holocen u Dalmaciji*, PhD Dissertation, University of Zagreb, Zagreb, 319 p.
- VUKOSAVLJEVIĆ N., PERHOČ Z., ALTHERR R. (2014) – Prijelaz iz pleistocena u holocen u pećini Vlakno na Dugom otoku (Dalmacija, Hrvatska) – litička perspektiva [Pleistocene-Holocene Transition in the Vlakno Cave on the Island of Dugi Otok (Dalmatia, Croatia). Lithic Perspective,], *Prilozi instituta za arheologiju*, 31, p. 5-72.
- VUKOSAVLJEVIĆ N., PERHOČ Z. (2020) – Kasnomezolitike izradvine od lomljenog kamena, in S. Forenbaher, D. Radić and P. T. Miracle (eds.), *Špilja Žukovica na Korčuli: rezultati istraživanja 2013.-2014., Sv. 1: Neporemećeni slojevi neolitika i mezolitika*, Vela Luka, Centar za kulturu, p. 47-60.
- ZLATUNIĆ R. (2003) – Neolitički pogrebni ukopi na prostoru istočne jadranske obale i njezinom širem zaleu (Prijelazna zona). Tipološko-statistička analiza, *Vjesnik Arheološkog muzeja u Zagrebu*, 36, p. 29-96.

