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CHIPPED STONE INDUSTRY FROM THE EARLY LBK HILLTOP SETTLEMENT AT SPYTIHNĚV (SOUTHEASTERN MORAVIA, CZECH REPUBLIC)

ABSTRACT: The new Early Neolithic settlement was discovered in the Spytihněv – "Na vrších" field (Zlín District) during a 2007 survey. Its hilltop position, which allowed the control of the surrounding landscape, including both the Lower and the Upper Morava River valleys and Napajedla Gate (a narrow passage connecting both the valleys), makes the location unique. Since its discovery, the site has been subject to repeated surface surveys, a geomagnetic survey, and two small-scale area excavations conducted in 2007 and 2016. Five sunken settlement features dated back to the Ia phase of LBK, both according to relative chronology and radiocarbon dating, have been excavated to date. The site is also unique for its numerous occurrences of chipped industry. The Spytihněv – "Na vrších" lithic artefacts collection prevailingly consists of imported raw materials and currently represents the most numerous Early Neolithic assemblage in Moravia, although the dimensions of the excavated area were spatially limited. The paper aims at a comprehensive analysis of the chipped stone industry from this settlement in the context of the Middle Danube area.

KEY WORDS: Morava River Valley – Mesolithic-Neolithic Transition – Early Neolithic – LBK – Lithic industry – Raw material networks – Techno-typological analysis

1. INTRODUCTION

The spread of the Neolithic way of life in Moravia, respectively in the Czech lands, has been the subject of lively debate over the last decades (e.g. Zvelebil 1986, 2004, Zvelebil, Pettitt 2008, Pavlů 2004, 2005, 2014, Pavlů, Vokolek 1992, 1996, Divišová 2012, Šída 2011, 2014, Tichý 2014, Květina *et al.* 2015, Oliva 2015a, Beneš 2018 etc.). Slavomil Vencl was one of the leading Czech researchers involved in this topic and his comprehensive view of the extinction of hunter-gatherer communities and the introduction of the Neolithic included anthropological, demographic, ecological, paleoenvironmental, ethnological, chronological, and

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archaeological aspects (Vencl 1982, 1986, 2019). His numerous articles concerning Mesolithic and Early Neolithic lithic industries (e.g. Vencl 1960, 1971, 1989, 1990, 1991, 1992, Vencl *et al.* 2006 etc.) represent the basic datasets in the Czech lands. For these reasons, we would like to dedicate our article to his memory.

Knowledge of Early Neolithic lithic knapping technology in Moravia is currently based on several reference assemblages that are limited in the total number of artefacts (cf. Mateiciucová 2008: 22, Table 1). The new Linear Band Ceramic culture (LBK from herein) assemblage from Spytihněv – "Na vrších" (Zlín District) in southeastern Moravia is rich in finds and double the number of available Early LBK lithics. This key hilltop site represents a new impulse for the study of Early Neolithic raw material procurement, lithic technology, typology, and settlement and subsistence strategies in Moravia. This paper focuses on a comprehensive evaluation and presentation of the chipped stone industry from the 2007 and 2016 excavations in a broader regional context.

2. SITE LOCATION AND RESEARCH HISTORY

Geomorphologically, the Napajedla Gate represents the narrowest section (700–800 m in width between Maková Hill, whose summit reaches 338.1 m a.s.l., and Napajedla Hill, whose summit reaches 276.1 m a.s.l.) of a natural corridor of the Morava River Valley that separates the Upper and Lower Morava River Valleys. This passage connects the Outer Western Carpathian Depressions with the southern Moravian part of the Vienna Basin (Demek *et al.* 1987). The Morava River Valley separates the Central Moravian Carpathians in the west, represented at its easternmost part by the Chřiby Hills, from the Vizovice Highlands of the Slovak-Moravian Carpathians in the east.

Geologically, the area of interest is primarily composed of Paleogene sediments of the Rača Unit of the Magura Group of nappes. In terms of surface exposure, the alternating mudstones and sandstones of the Vsetín Member of the Zlín Formation cover, as the youngest fly ash sediments, the largest area of the upper parts of both the river valley slopes. The lower parts of both river valley slopes are covered with quaternary loess and loess sediments, which differ in thickness. These sediments were subject to erosion (mostly landslides that resulted in slopes free of quaternary sediment, which only survived within limited islands).

The Napajedla Gate represents a strategic point within the landscape that attracted hunter-gatherers who controlled and hunted the animal herds migrating through the narrow corridor. This resulted in frequently documented traces of Upper Paleolithic occupation including Gravettien/Epigravettian (cadastral territories Spytihněv, Napajedla, and Pohořelice near Napajedla, Oliva 1998, Škrdla 2005, Škrdla *et al.* 2008). In addition, the adjacent area to the north is known as a rich Aurignacian surface site cluster (Napajedla, Žlutava, Nová Dědina, Bělov, Karolín u Sulimova, and Kvasice, Oliva 1987, 1998). The broader area of Napajedla Gate was, therefore, subject to an intensive survey aimed at discovering new stratified Paleolithic sites at the very beginning of the third Millennium AD (the Czech Science Foundation project entitled Pavlovian of the Lower Morava River Valley). Besides discoveries of many important stratified and surface Upper Paleolithic sites (Škrdla *et al.* 2008), an important Early Neolithic site was discovered in the cadastral territory of Spytihněv, in the "Na vrších" field during the realization of the above-mentioned project. There were many known LBK find-spots on the lower altitudes along the Morava River in the area of the Napajedla Gate (Hrubý 1939, Hrubý, Pavelčík 1992, a series of Hrubý's reports deposited in the Archive of ARÚB) although the topographic position of the recently discovered LBK site significantly differs. It is located on an elevated position (altitude ranges between 310–325 m) high above the river (c. 130–155 m above the current river level) close to the highest point within the Napajedla Gate – Maková Hill (*Figure 1*). The spot provides a panoramic view of the Lower Morava River Valley to the northeast, east, and south and the Chřiby Hills to the southwest, west and northwest (only the northern direction is shaded by the Maková Hill summit). The surface of the area is composed of colluvial sediments covering weathered bedrock that is not fertile soil suitable for plant growth.

Since its discovery, the Spytihněv – "Na vrších" site had been repeatedly surveyed, which has resulted in a collection of surface finds (part of these – finds collected to 2007 – was published by Schenk *et al.* 2008). The series of test pits dug in the summer of 2007 identified a sunken feature (No. 500), which was immediately excavated and yielded a collection of lithic artefacts, pottery sherds and charcoal for AMS dating that proved the Early LBK age of the site (Schenk *et al.* 2008).

The previous surface surveys were followed by a geomagnetic survey in 2015. This survey documented

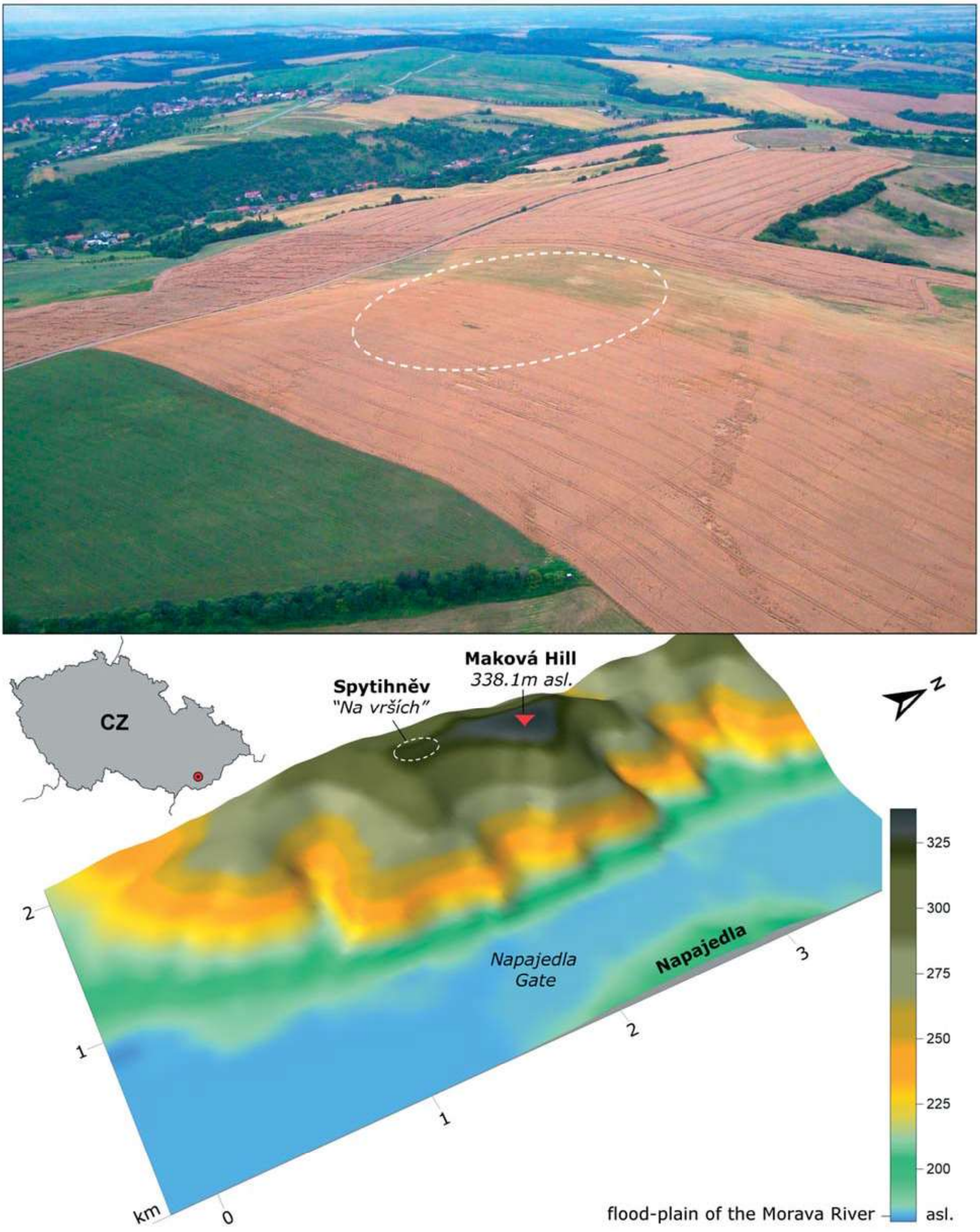

FIGURE 1: Aerial photo of the site (dashed line) and location of the site on a digital elevation model.

several hundred magnetic anomalies that differed in shape and dimension indicating intensive occupation of the site. The estimated dimensions of the site based on the currently available geomagnetic data cover an area of c. 4.5–5 hectares. A virtual grid (5×5 m) was placed over the whole area for subsequent excavation purposes and a unit in the northwestern part of the area was excavated in 2016. This excavation documented four sunken features (labelled as 501–504) within an area of 25 m^2 (Bartík *et al.* 2017). The features infill was rich in Early Neolithic lithics supplemented by other common components of material culture. In addition, large paleobotanical samples resulting from wet sieving of the sediment enabled paleoenvironmental reconstruction and radiocarbon dating.

3. MATERIAL AND METHODS

The current assemblage from the site of interest comprises 719 lithic items. While the surface collection obtained by non-systematic surveys conducted during 2006–2020 consists of only 75 items (10.4%), the major part of the assemblage was excavated within the sunken feature infills (*Table 1*) and only isolated artefacts (5%) were obtained from intact colluvial sediments (a 20–30 cm thick cultural layer between plough soil and bedrock). This layer was only identified within the 2016 excavated area and was missing from the 2007 excavated area. As the 2007 area was located on the edge of a plateau downslope compared to the 2016 area, the missing layer can be interpreted as a result of slope erosion. Therefore, Feature No. 500 was dug into the bedrock covered with thin topsoil (cf. Schenk *et al.* 2008: 226).

The unusually high number of artefacts retrieved from the sunken features (compared to the previously obtained assemblages from other sites) primarily reflect the enhanced excavation methodology applied and most likely the uniqueness of the site. The excavation of the sunken features reflected the natural layers, and all the infill volumes were sieved in water using 2×2 mm grid sieves. The application of wet sieving succeeded in increasing the number of small finds including the smallest fraction of production waste that is often (when applying the usual excavation methods without wet sieving) missing. The presence of small finds resulting from wet sieving also increased the share of refitted artefacts. A complex analysis of the knapped lithic industry includes a raw material determination, a reconstruction of the raw material

TABLE 1: Raw materials according to number and weight within individual contexts.

		Context																	
		Feature 500		**Feature 501**		**Feature 502**		**Feature 503**		**Feature 504**		**Cultural layer**		**Surface**					
Distribution category	Raw material	(pcs.)	(g.)	(pcs.)	(g.)	(pcs.)	(g.)	(pcs.)	(g.)	(pcs.)	(g.)	(pcs.)	(g.)	(pcs.)	(g.)	∑ (pcs.)	∑ (g)	% (pcs.)	% (g)
Long distance	Obsidian	1	1.1	10	2.9	-	-	-	-	-	-	-	-	-	-	11	4.0	1.5	0.2
Interregional	Kraków-Częstochowa Jurassic silicite	66	117.8	6	5.5	3	4.4	2	-	-	-	2	3.0	7	67.4	86	198.1	12	10.2
Interregional	Bakony radiolarite	110	18.4	9	9.0	12	8.3	11	3.7	2	0.6	11	4.4	11	371.8	166	416.1	23.1	21.5
Interregional	Erratic flint	298	293.3	14	24.7	14	10.9	13	14.1	3	0.4	21	50.8	36	743.6	399	1,137.7	55.5	58.75
Regional II	Limnosilicite	-	-	-	-	1	2.0	-	-	-	-	-	-	-	-	1	2.0	0.1	0.1
Regional I	White Carpathian radiolarite	22	2.8	-	-	-	-	1	0.2	-	-	-	-	6	25.3	29	28.3	4.1	1.5
Local I	Chert	2	37.8	-	-	-	-	-	-	-	-	1	12.3	7	51.0	10	101.2	1.4	5.3
Local I	Quarzit	3	0.6	-	-	-	-	1	0.1	-	-	1	0.3	-	-	5	1.0	0.7	0.05
Local I	Silicified claystone	-	-	-	-	-	-	-	-	-	-	-	-	1	34.0	1	34.0	0.1	1.8
Undefined	Undefined	-	-	2	0.5	-	-	2	0.7	-	-	-	-	7	10.3	11	11.5	1.5	0.6
	∑	502	471.8	41	42.6	30	25.5	30	18.8	5	0.9	36	70.8	75	1,303.5	719	1,933.8	100	100

network, a technological analysis concerning the individual phase of the operation chain, and an analysis of the tools according to the individual raw material and the blanks used.

The prevailing part of the raw materials was only determined macroscopically, which shows small uncertainties in the identification of erratic flint and Kraków-Częstochowa Jurassic silicite within the category of small items. Only selected specific raw materials were determined in collaboration with A. Přichystal under a stereomicroscope with the help of water immersion. For the description of the distribution of individual lithic raw materials (*Table 1*), the system applied by I. Mateiciucová and G. Trnka (2015) was used – 1) Site catchment = less than 6.25 km from the site, 2) Local I = 6.25 to less than 12.5 km from the site, 3) Local II = 12.5 to less than 25 km, 4) Regional I = 25 to less than 50 km, 5) Regional II = 50 to less than 100 km, 6) Interregional = 100 to less than 200 km, 7) Long-distance = 200 to less than 400 km, 8) Continental = more than 400 to less than 700 km.

4. RESULTS

4.1 Raw materials

Lithic chipped industry from Spytihněv – "Na vrších" was produced on prevailing high quality imported raw materials supplemented by regional or local provenience raw materials (*Figure 2*). The most important interregional raw material is represented by erratic flint (55% of pcs.), prevailing both in the number of identified items and the weight (*Table 1*) in all the features assemblages as well as in the surface collection. Its source area is expected to be within the glaciofluvial deposits of southern Poland and northern Moravia (Přichystal 2009), i.e. from the northeastern direction. If its transport route utilised the natural corridors of the Upper Morava River Valley and the Moravian Gate, the distance to usable outcrops reached c. 90–150 km. Another interregional raw material of southern Polish origin – Kraków-Częstochowa Jurassic silicite – was imported through the same route as erratic flint (*Figure 3*). Its share consists of 12% in the case of the number of items and 10.2% in the case of the weight while the minimum distance to its outcrops reaches c. 175 km in a direct line.

The second most used imported raw material is represented by radiolarites from the Bakony Mountains in Hungary. Its share (23.1% of pcs.) is slightly higher compared to Kraków-Częstochowa Jurassic silicite although this raw material was imported from the opposite direction – from south-southwest and the distance of the outcrops is c. 230 km in a direct line (*Figure 3*). Although the characteristic intensive red to brown variety with a whitish to beige cortex previously described as the Szentgál-type prevails and several items are characterised with a yellowish to ochre colour, previously described as the Úrkút-Eplény-type, these sub-types can be found together within its primary outcrops as summarised under Bakony radiolarite (which is the current state of the art in Hungarian literature, cf. Szilagi 2017).

Obsidian from southeastern Slovakia (Zemplín Mountains area, Přichystal, Škrdla 2014, Bača *et al.* 2017, Kaminská 2021) represents a single case of long-distance distribution. This raw material was imported from a distance reaching over 320 km in a direct line (from the east, in this case, *Figure 3*). Compared to the three previously mentioned raw materials present in all the features and the surface collection, the distribution of obsidian was not as regular. Obsidian was documented in Feature No. 500 as an isolated item and in Feature No. 501, where it had a significant share (24.4% of pcs., *Table 1*).

Radiolarite from the Klippen Belt area of the White Carpathians represents a regional raw material. It was imported from the east, from a distance of c. 40–50 km (*Figure 3*). The reddish-brown and green varieties, including items stripped or shaded into each other prevail, supplemented by a light grey to bluish-grey

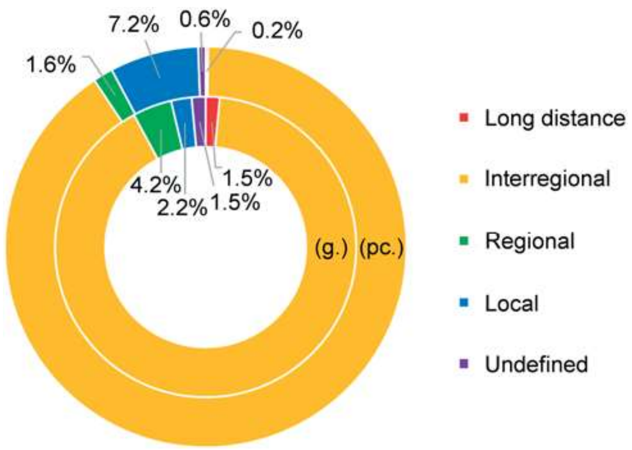

FIGURE 2: Proportion of raw materials according to distance from the source.

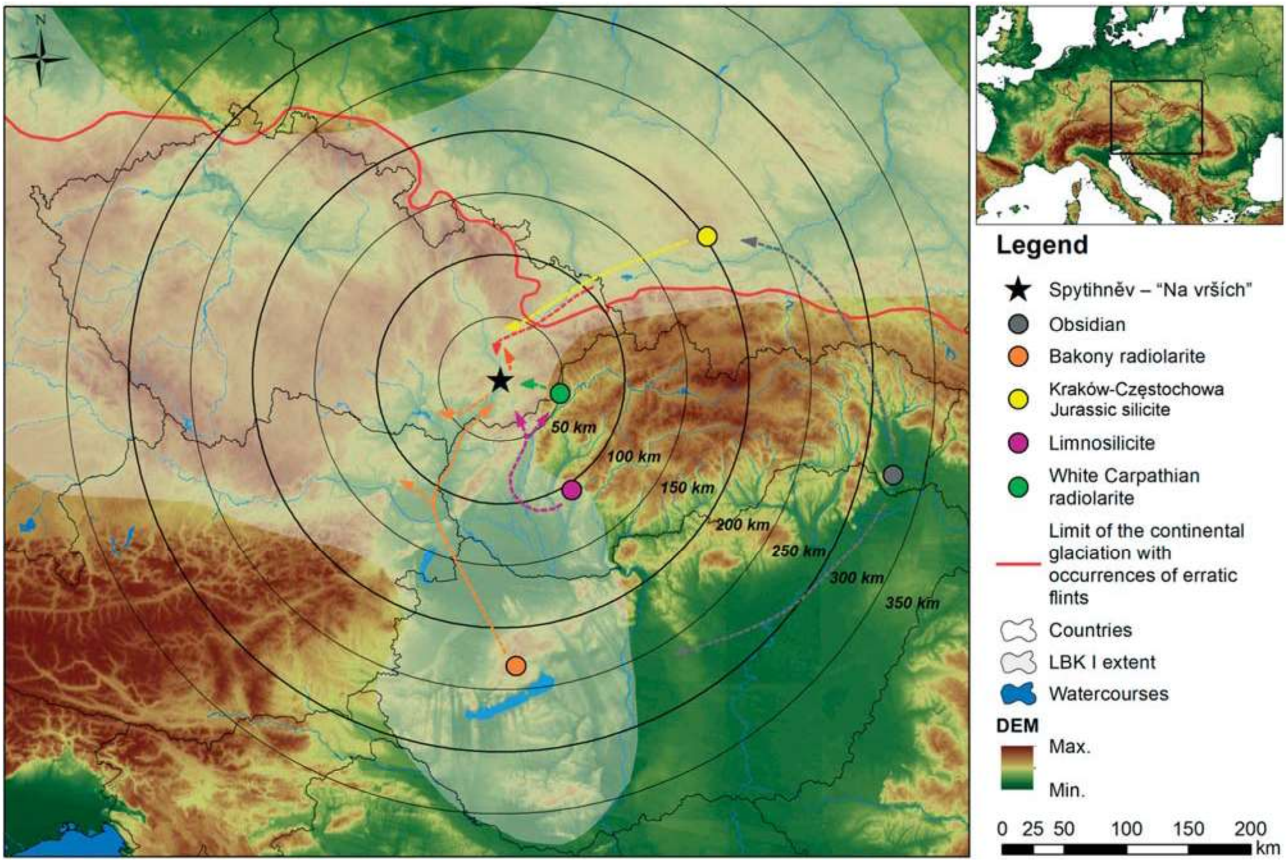

FIGURE 3: Location and distance of individual imported raw material sources utilised at the Spytihněv LBK settlement.

colour (e.g. *Figure 11: 17*) with a light beige pebble cortex recently defined as the Kašňák-type (Cheben *et al.* 2017). It is known from the principal outcrop near Sedmerovec (Ilava district, western Slovakia) although similar colour varieties are also known (A. Přichystal, pers. comm.) from outcrops near the neighbouring village of Vršatské Podhradie (Ilava district, western Slovakia). Only a single item from Spytihněv has the above-mentioned cortex (*Figure 11: 10*). The distribution of White Carpathian radiolarite is not homogeneous within individual collections – there are six items in the surface collection with only a greater share in Feature No. 500 (often small chips, compare the number of items and weight in *Table 1*), and a single item was present in Feature No. 503.

The list of regional raw material is completed by an isolated item (Feature No. 502) of greyish-brown limnic siliceous rock (*Figure 10: 8*) where the nearest possible outcrops are in southwestern Slovakia c. 80–90 km away from the site (*Figure 3*).

The raw material spectrum also consists of a small share of local rocks including Krumlovský les-type chert, orthoquartzite, and révaite. The local Jurassic cherts with a characteristic black cortex (desert varnish) are petrographically similar to the Krumlovský les-type chert but are lower in quality. The outcrops of these cherts are in the high gravel terraces of the paleo-Morava River located, for example, above the villages of Traplice and Kudlovice (Škrdla, Přichystal 2003, Přichystal 2009: 79). The presented assemblage consists of artefacts made from low-quality chert that is light bluish-grey and similar to the Krumlovský les-type chert, variety I. In addition, two artefacts in the surface collection show a higher quality mass and their provenience directly from the Krumlovský les outcrops cannot be excluded.

The orthoquartzite of the *sluňák* (sun boulder) type was only present in the form of small chips, which suggest it was possibly utilised as pebble hammer stone rather than for chipped artefacts.

TABLE 2: Dynamic classification of the technological phases according to context.

	Context								
Exploitation phase	**Feature 500**	**Feature 501**	**Feature 502**	**Feature 503**	**Feature 504**	**Cultural layer**	**Surface**	**∑**	**%**
Raw material	1	-	-	-	-	-	4	5	0.7
Raw material with testing scars	-	-	-	-	-	1	7	8	1.1
∑ I	**1**	**-**	**-**	**-**	**-**	**1**	**11**	**13**	**1.8**
Pre-core	1	-	-	-	-	-	-	1	0.15
First blank	-	-	-	-	-	-	-	-	-
Cortical blank	10	-	-	1	-	-	3	14	2.00
Blank with cortex part	7	1	-	1	-	3	10	22	3.1
Crested flake from core	-	1	-	-	-	-	1	2	0.3
Crested blade from core	-	1	1	-	-	2	-	4	0.55
Trimming flake	12	2	3	-	-	3	3	23	3.2
Trimming blade	-	2	-	-	-	-	-	2	0.3
∑ II	**29**	**7**	**4**	**2**	**-**	**8**	**17**	**68**	**9.6**
Reduced core	1	-	-	-	-	-	1	2	0.3
Flake with lateral cortex	4	-	-	-	-	1	2	7	1.0
Blade with lateral cortex	3	-	2	2	-	3	2	12	1.7
Bladelet with lateral cortex	1	1	2	1	-	-	-	5	0.7
Flake without cortex	-	-	-	-	-	-	4	4	0.55
Blade without cortex	16	4	9	2	-	3	15	49	6.8
Bladelet without cortex	23	7	5	6	-	6	2	49	6.9
Blade/bladelet outrepassé	2	-	-	-	-	1	-	3	0.4
∑ III	**50**	**12**	**18**	**11**	**-**	**14**	**26**	**131**	**18.4**
Blank rejuvenating striking platform	-	-	-	-	-	-	1	1	0.15
Blank rejuvenating flaking surface	1	-	-	-	-	-	-	1	0.15
∑ IV	**1**	**-**	**-**	**-**	**-**	**-**	**1**	**2**	**0.3**
Remnant core	6	1	-	-	-	-	7	14	2.00
Core fragment	3	-	-	-	-	-	2	5	0.7
Blank fragments and small chips	412	21	7	17	5	13	11	485	67.5
Splinters	-	-	1	-	-	-	-	1	0.15
∑ V	**421**	**22**	**8**	**17**	**5**	**13**	**20**	**505**	**70.4**
Total	**502**	**41**	**30**	**30**	**5**	**36**	**75**	**719**	**100**

A single fragment with undiagnostic traces of knapping is represented by silicified claystone (révaite) whose outcrops are known from the Morava River gravels that have been exploited, for example, near Ostrožská Nová Ves. However, other outcrops are known to the north in the Kroměříž and Hulín areas (Přichystal 2009: 80).

Seventeen artefacts from a different context were burnt and the surface alterations (both in colour and damage) to eleven (1.5%) of them did not enable raw material identification (*Table 1*).

4.2 Technology

Although it consists of lithics from a spatially limited area, the analysed collection represents an almost complete operational chain from the dynamic classification (Schild 1980) aspect (*Table 2, 3*). The basic technological categories are presented in the graph in *Figure 4*. Wet sieving of excavated feature infillings resulted in an increased share of technological waste – blank fragments and small chips together compose the prevailing part (67.3%) of the collection. The blanks produced from the cores (prevailing blades and bladelets) represent the second most numerous group (18.4%). Non-cortical regular-shaped flakes are infrequent. In general, the LBK industry in Spytihněv is characterised as primarily blade and bladelets oriented, where blade blanks were prevailingly selected for tool production (see Chapter 4.3). The collection is completed by a variable group of preparatory products (9.4%) and natural forms (blocks/nodules/pebbles) of raw material including forms with testing scars (1.8% altogether).

Raw material with testing scars

The particular raw material was imported to the site in a form that can be reconstructed based on the natural blocks/nodules/pebbles of raw material, raw material with testing scars, and preparatory cortical or partial cortical flakes. Except for silicified claystone represented by a single item, two types of raw material – erratic flint and local cherts – were imported as natural forms or forms with testing scars.

The erratic flint was imported in the form of irregular nodules with a glacial surface, c. 5–10 cm in dimension with a weight ranging between 55–126 g. A single item from Feature No. 500 was a small pebble (1.2 cm, 0.4 g). The flaked surfaces of all the items show a white patina and, as a minimum, in a single case, the artefact represents a secondary use of a Paleolithic artefact (Paleolithic sites rich in artefacts made from erratic flint are located nearby (Škrdla *et al.* 2008). Local cherts were imported in the form of small pebbles with a characteristic black or grey cortex and their fragments. The largest pebble fragment was 5.3 cm in size.

The collection from Spytihněv yielded important and new information concerning the form of imported Hungarian Bakony-type radiolarite – a large block (dimensions: 73×67×56 mm, 309 g) of this raw material with several testing scars (*Figure 8: 7*). The previously known Moravian finds of this raw material were described as tools or blade/flake blanks (cf. Vokáč 2003: 152, Mateiciucová 2008: 220, 246, 264, Nerudová 2011: 21).

Some raw material with testing scars that were not used for lithic artefact production served secondarily as hammerstones.

Pre-cores and cores

Cores including their fragments (22 items, 3.1% of the collection) were documented in three contexts – Features No. 500, 501, and surface collection (*Table 1*). These cores were made prevailingly on erratic flint (14 items), followed by Kraków-Częstochowa Jurassic silicite (5 items) while a single item is made from Bakony radiolarite. The most representative collection of cores in different stages of their exploitation yielded Feature No. 500. A partially decortified nodule of erratic flint is represented by an abandoned pre-core after a large flake removal (refitted) because of the lower quality of the inner part of this nodule (*Figure 6: 4*). A single platform core on erratic flint (dimensions 41×41×22.5 mm) represents the early stage of exploitation. It was made on a smaller pyramid-shaped nodule. This core was initiated from the natural edge between two glacial surfaces without forming a frontal crest. Contrary to the core frontal face, the platform was carefully prepared with a series of small flake removals in the direction from the core front to the core back. The core back was not prepared (*Figure 5: 3*). This core yielded a small series of bladelets (often 7–8 mm in width) before it was abandoned. In addition, Feature No. 500 yielded three small (up to 35 mm) exhausted cores, supplemented by two small and larger core fragments from erratic flint. Two of the above-mentioned cores represent single platform cores reduced from a wide core front with a faceted striking platform. The edge between the striking platform and the core front has the character of a zigzag line with a protrusion enabling to remove the next blank. The core front of both cores shows scars from bladelet

TABLE 3: Dynamic classification of the technological phases according to raw material. Abbreviation: OB – obsidian; KCJ – Kraków-Częstochowa Jurassic silicite; BR – Bakony radiolarite; EF – erratic flint; L – limnosicite; WCR – White Carpathian radiolarite; CH – chert; Q – quartzit; SC – Silicified claystone; UN – undefined.

	Raw material											
Exploitation phase	**OB**	**KCJ**	**BR**	**EF**	**L**	**WCR**	**CH**	**Q**	**SC**	**UN**	**∑**	**%**
Raw material	-	-	-	1	-	-	3	-	1	-	5	0.7
Raw material with testing scars	-	-	1	6	-	-	1	-	-	-	8	1.1
∑ I	**-**	**-**	**1**	**7**	**-**	**-**	**4**	**-**	**1**	**-**	**13**	**1.8**
Pre-core	-	-	-	1	-	-	-	-	-	-	1	0.15
First blank	-	-	-	-	-	-	-	-	-	-	-	-
Cortical blank	-	6	1	6	-	-	1	-	-	-	14	2.00
Blank with cortex part	-	4	1	15	-	1	1	-	-	-	22	3.1
Crested flake from core	-	-	2	-	-	-	-	-	-	-	2	0.3
Crested blade from core	-	1	-	3	-	-	-	-	-	-	4	0.55
Trimming flake	1	5	4	11	1	1	-	-	-	-	23	3.2
Trimming blade	1	-	-	1	-	-	-	-	-	-	2	0.3
∑ II	**2**	**16**	**8**	**37**	**1**	**2**	**2**	**-**	**-**	**-**	**68**	**9.6**
Reduced core	-	-	-	2	-	-	-	-	-	-	2	0.3
Flake with lateral cortex	-	-	2	4	-	1	-	-	-	-	7	1.0
Blade with lateral cortex	-	2	-	10	-	-	-	-	-	-	12	1.7
Bladelet with lateral cortex	-	-	-	5	-	-	-	-	-	-	5	0.7
Flake without cortex	-	3	-	1	-	-	-	-	-	-	4	0.55
Blade without cortex	1	4	16	22	-	3	2	-	-	1	49	6.8
Bladelet without cortex	-	8	14	24	-	-	-	-	-	3	49	6.9
Blade/bladelet outrepassé	-	1	1	1	-	-	-	-	-	-	3	0.4
∑ III	**1**	**18**	**33**	**69**	**-**	**4**	**2**	**-**	**-**	**4**	**131**	**18.4**
Blank rejuvenating striking platform	-	-	-	-	-	-	1	-	-	-	1	0.15
Blank rejuvenating flaking surface	-	-	1	-	-	-	-	-	-	-	1	0.15
∑ IV	**-**	**-**	**1**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**2**	**0.3**
Remnant core	-	5	1	8	-	-	-	-	-	-	14	2.00
Core fragment	-	2	-	3	-	-	-	-	-	-	5	0.7
Blank fragments and small chips	8	45	121	275	-	23	1	5	-	7	485	67.5
Splinters	-	-	1	-	-	-	-	-	-	-	1	0.15
∑ V	**8**	**52**	**123**	**286**	**-**	**23**	**1**	**5**	**-**	**7**	**505**	**70.4**
Total	**11**	**86**	**166**	**399**	**1**	**29**	**10**	**5**	**1**	**11**	**719**	**100**

removals although the core back differs. While a core back from the first core was not prepared (*Figure 5: 2*), a core back from the second core was prepared perpendicular to core axe removals (from both core sides). The latter core also has scars on its distal end (*Figure 5: 1*). The third core was turned after several bladelet removals and only a single removal was taken from the new platform and then the core was abandoned (*Figure 6: 1*).

Feature No. 500 also yielded three single platform cores made from Kraków-Częstochowa Jurassic silicite. These cores are larger (up to 45 mm) compared to the cores described above that are made from erratic flint. The platforms were carefully prepared with a series of small flake removals similar to the cores made from erratic flint. The front faces indicate blade and bladelet removals and initialisation with frontal crest removal. As only one crest blade was documented within the available collection, these cores may have been imported in a reduced form to the site or prepared and initialised in a different part of the site. The core backs were not prepared as indicated on the two core backs formed by a natural crack and a core with a cortical back. The first of the cores was abandoned due to a crack caused by inner inhomogeneity (*Figure 7: 24*), the second after a series of hinged blanks (*Figure 6: 2*), and the third after overshooting the removal of a part of the distal end (refitted) after a previous series of hinged blank removals (*Figure 7: 23*).

Feature No. 501 yielded only a multiplatform bladelet core (dimensions: 32×27×19 mm) made from a nodule of erratic flint (*Figure 6: 3*).

The surface survey enriched the number of diagnostic cores from the site. Five single platform cores with blade and bladelet scars were made on the erratic flint. Except for a larger core reduced from a narrow edge (dimensions 35×37×51 mm) and allowing for further reduction (*Figure 8: 6*), all the other cores are small and exhausted (maximum length ranges between 23–36 mm, *Figure 8: 1–5*). Core platforms were similarly prepared as in the case of the items in Feature No. 500 with a series of small flake removals and some of them were abraded. One of these that was abandoned after a hinged removal represents the reutilisation of a white patinated Paleolithic artefact (*Figure 8: 5*). Four cores are made on the Kraków-Częstochowa Jurassic silicite. The most important of these is a single platform core (dimensions: 31×16×17.5 mm) that is pyramid-shaped with regular-shaped bladelet scars (*Figure 8: 2*), supplemented by two core fragments and a residual core with several flake scars. A small core with an irregular bladelet or flake removals made on a fragment of yellowish Bakony radiolarite completes the surface collection of cores (*Figure 8: 3*).

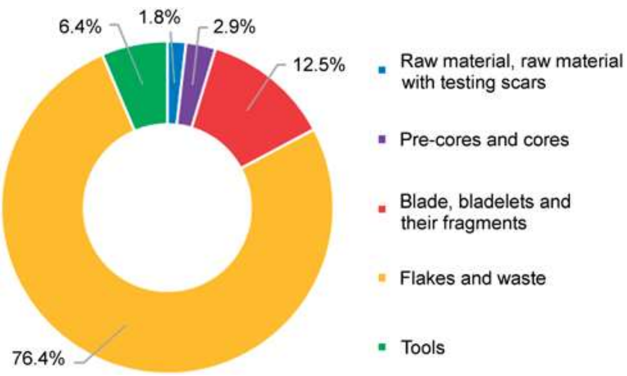

FIGURE 4: Basic morphological groups of the lithic chipped industry.

Blade, bladelets and their fragments

The technology of the LBK site at Spytihněv is characterised as blade oriented, which resulted in the prevailing blade and bladelet blanks (*Table 2, 3*), and together with their fragments, compose 12.5% of the collection (*Figure 4*). If calculated together with blades and bladelets utilised for retouched tool production under the dynamic classification approach, their share increases to 17.4%.

The ratio between blades and bladelets (i.e. blanks less than 10 mm in width) reach 69:56. However, the boundary between both categories is only terminological as the histogram of the blade and bladelet widths indicate a regular course rather than a gap between both categories and almost corresponds with normal (Gauss-Laplacean) distribution (*Figure 9*). While the mean for the blade and bladelet widths (*Table 4*) is similar for all the features, in the case of the surface collection it increases, which can indicate the selective collection of larger artefacts during the surface survey.

The mean length of the blade and bladelet blanks is 33.1 mm although only 9.8% of these are complete blanks (max. length of the complete blade is 42 mm), which probably indicates an underestimated value. On the other hand, the blank lengths correspond with the scars of the last removals on the cores, which indicates the raw materials used were relatively smaller in shape. Both the blade and bladelet blanks are often in the form of fragments (*Table 5*) – the highest share is of

TABLE 4: Width of blade products according to individual contexts.

	Context						
Width of blade products (mm)	**Feature 500**	**Feature 501**	**Feature 502**	**Feature 503**	**Cultural layer**	**Surface**	**ø for all site**
ø	8.9	9.1	10.7	9.7	9.1	12.6	9.9
Min.	4	6	6	6	6	8	6
Max.	15	16	21	18	15	21	17.7

TABLE 5: Fragmentarisation of blade products according to individual contexts.

	Context								
Categories	**Feature 500**	**Feature 501**	**Feature 502**	**Feature 503**	**Feature 504**	**Cultural layer**	**Surface**	**∑**	**%**
Complete	5	2	1	2	-	2	1	13	10.4
A	11	5	3	1	-	3	2	25	20
AB	13	3	6	2	-	3	5	32	25.6
B	9	3	5	4	-	2	5	28	22.4
BC	3	1	3	-	-	3	6	16	12.8
C	4	1	-	2	-	3	1	11	8.8
∑	**45**	**15**	**18**	**11**	**-**	**16**	**20**	**125**	**100**

TABLE 6: Types of butts according to individual contexts.

	Context								
Categories	**Feature 500**	**Feature 501**	**Feature 502**	**Feature 503**	**Feature 504**	**Cultural layer**	**Surface**	**∑**	**%**
Plain	7	4	1	-	-	1	5	18	29.1
Facetted	15	4	9	3	-	7	4	42	67.7
Punctiform	2	-	-	-	-	-	-	2	3.2
∑	**24**	**8**	**10**	**3**	**-**	**8**	**9**	**62**	**100**

mesial parts (B) and blanks with a broken off proximal end (AB, categories according to Šída 2007: 19, Fig. 1). This distribution reflects the final stage of the operational chain, when the blades and bladelets were modified (broke) and their straight edges were selected for truncated blades, trapezes, and other tools (see Chapter 4.3).

Butt (dimension, preparation, angle between platform and front face of the core) and blank cross-sections (vertical and horizontal) analysis allows a detailed description of the knapping technology. The collection from Spytihněv is characterised by prevailing small, faceted platform remnants without traces of dorsal abrasion that are supplemented with plain platforms formed by a natural crack or a single flake (*Table 6, 7*). Facetted butts are parts of cores with a platform formed by a series of small flake removals in the direction from the core front to the core back – a feature frequently documented on analysed cores. The character of the butts is consistent within the collection with no significant differences among the individual features or raw materials (*Table 6, 7*).

Blades and bladelets were removed by indirect percussion utilising a punch as indicated by a vertical

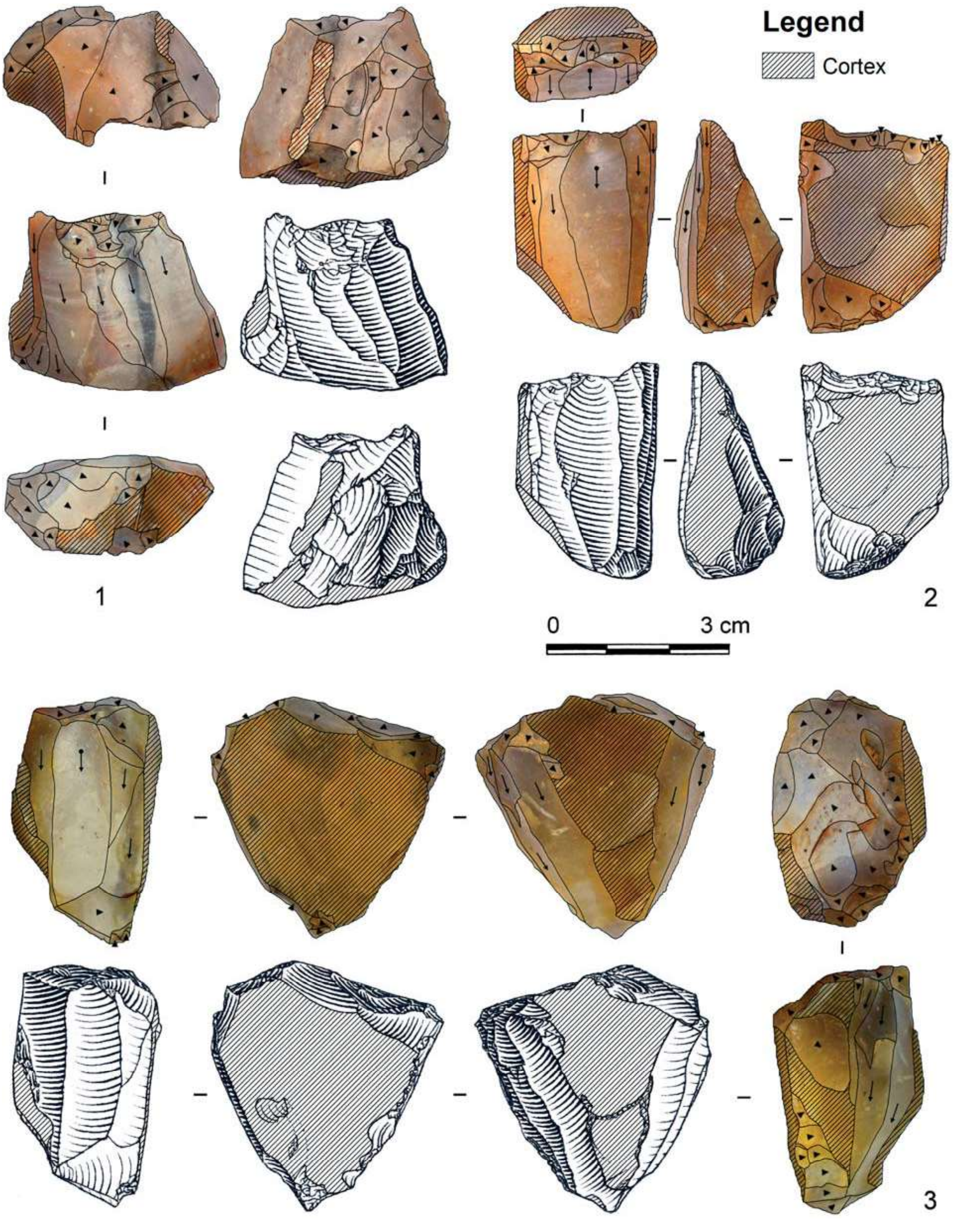

FIGURE 5: Selected cores from Feature No. 500.

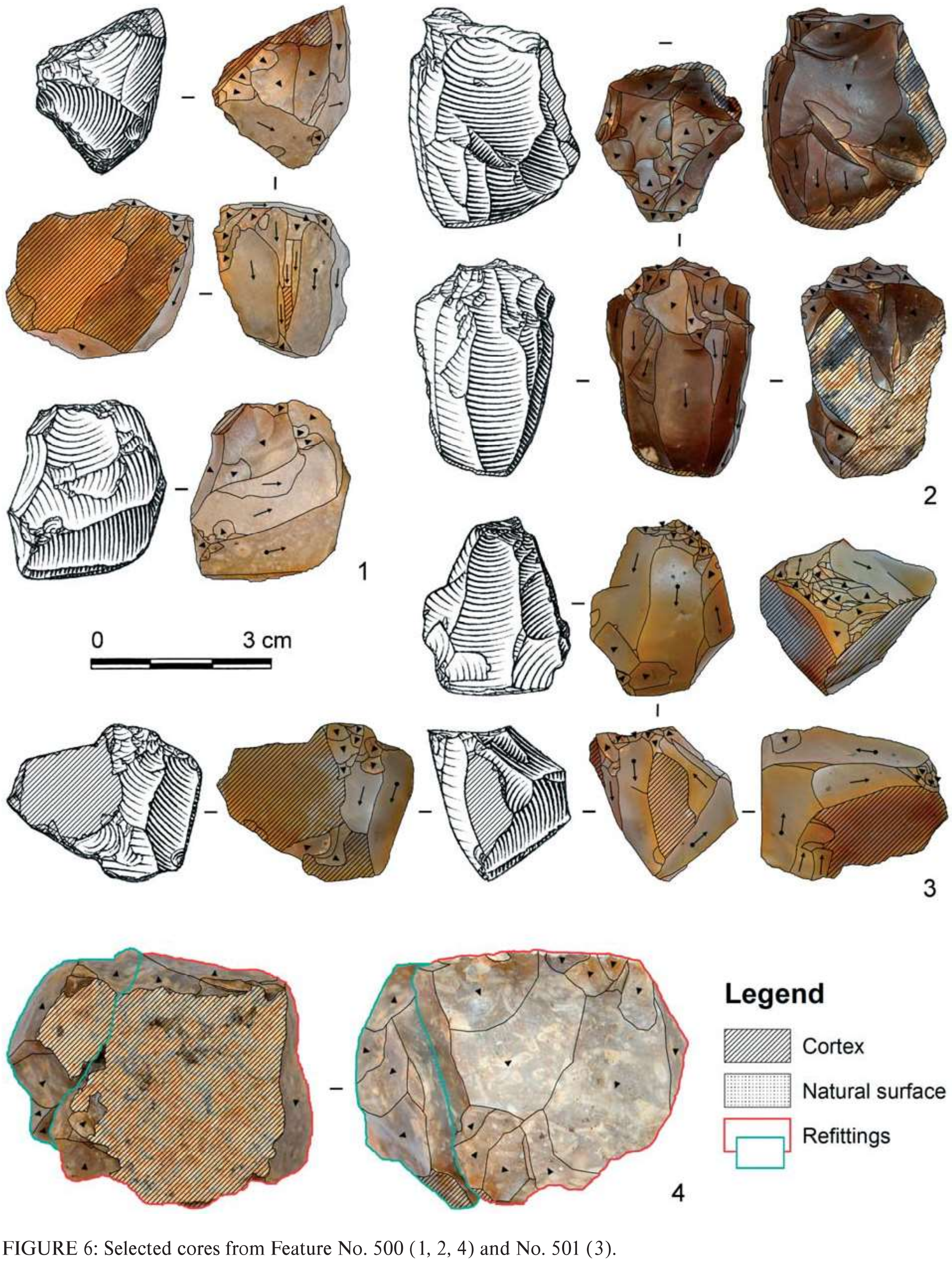

FIGURE 6: Selected cores from Feature No. 500 (1, 2, 4) and No. 501 (3).

TABLE 7: Types of butts according to individual raw materials. Abbreviation: OB – obsidian; KCJ – Kraków-Częstochowa Jurassic silicite; BR – Bakony radiolarite; EF – erratic flint; WCR – White Carpathian radiolarite.

	Raw materials						
Categories	**OB**	**KCJ**	**BR**	**EF**	**WCR**	**∑**	**%**
Plain	1	2	4	11	-	18	29.1
Facetted	-	7	13	21	1	42	67.7
Punctiform	-	-	-	2	-	2	3.2
∑	**1**	**9**	**17**	**34**	**1**	**62**	**100**

cross-section (or a side view) that is slightly S-curved in shape (e.g. *Figure 7: 20, 21, Figure 10: 3, 17–19, 29,* straight items are scarce – *Figure 7: 19*) and the angle between the platform and the core front is often almost 90°. Similar technology is also expected for other Middle Danubian Early Neolithic sites (Biró 2002, Mateiciucová 2008: 67, 73–78 with other ref.).

The target blade and bladelet blanks are supplemented with several blades from the early stage of core exploitation including four crested blades and two crested (metrically) flakes (*Figure 11: 20*). The crested items were documented for the three main raw materials used at the site (*Table 3*). The method of core initialisation utilising a prepared crest was supplemented by initialisation from the natural edge of the raw material (applied to erratic flint nodules with natural edges), which was documented in some Early Neolithic industries with well-analysed *chaîne opératoire* (e.g. Santaniello *et al.* 2020).

Flakes and waste

Production waste including flake fragments, small flakes (<2 cm), and microfragments represents a major part (67.3%) of the collection of lithics. The increased share of this category in the Spytihněv collection, when compared to the majority of other LBK sites in the Middle Morava River region (e.g. Buchlovice – "Loučky", Kostelany nad Moravou – "Roztoky", Zlín-Malenovice – "Zadní mezicestí"), is undoubtedly influenced by a systematic application of wet sieving. However, the Spytihněv collection, with its complete operational chain, differs from the above-mentioned sites that are characterised by the prevailing consumption industry rather than a workshop character.

Flakes (different items prevailing from the preparatory stage) are low frequency compared to blades (*Table 2, 3*). The share of cortical (1.9%) and partial cortical flakes (3.1%) is low. They are prevailingly made from erratic flint and Kraków-Częstochowa Jurassic silicite, while they are only present in single items within the Bakony and White Carpathian radiolarites.

Cortical and partial cortical flakes of erratic flint confirm the import of complete nodules or nodules with test scars. Contrary to erratic flint, Kraków-Częstochowa Jurassic silicite was imported in the form of pre-cores or prepared cores as unworked nodules and raw material with testing scars are missing.

In addition, several small flakes were probably removed during core maintenance, rejuvenation, or in the final phase of the core life.

As the site was connected to an supraregional network, this was reflected in a sufficient amount of imported rocks and the economy of production. Many cores were abandoned in the case of a technological fault or inner inhomogeneity. This corresponds with the marginal presence of rejuvenation flakes (0.3%), which includes a flake rejuvenating core striking platform from chert and a blank rejuvenating flaking surface from Bakony radiolarite.

Refittings

Refittings, a method joining the removed artefacts back into the original raw material blocks or nodules, is suitable for several reasons including reconstructing ancient knapping technology, verifying assemblage homogeneity, and analysing spatial distribution (e.g. Cziesla *et al.* 1990, Inizan *et al.* 1999: 94–96). As there were only four assemblages refitted in Spytihněv – "Na vrších", the degree of refitting-ability is low and indicates secondary refuse deposited into sunken features rather than spatially limited lithic workshop activity. The refitted assemblages from Spytihněv – "Na vrších" consist of only two items each and thus do not allow for Early Neolithic technology reconstruction.

A massive semi-cortical flake was joined with a pre-core from erratic flint in Feature No. 500 (*Figure 6: 4*). This flake was the last item removed as it indicated the low inner quality of the nodule that resulted in abandoning this pre-core. The distal fragment of overshot (outrepassé blade) joined with a single platform blade core made from Kraków-Częstochowa Jurassic silicite (*Figure 7: 23*) is from the same feature. Again, this artefact was the last item struck, which removed a large part of the distal part of the core due

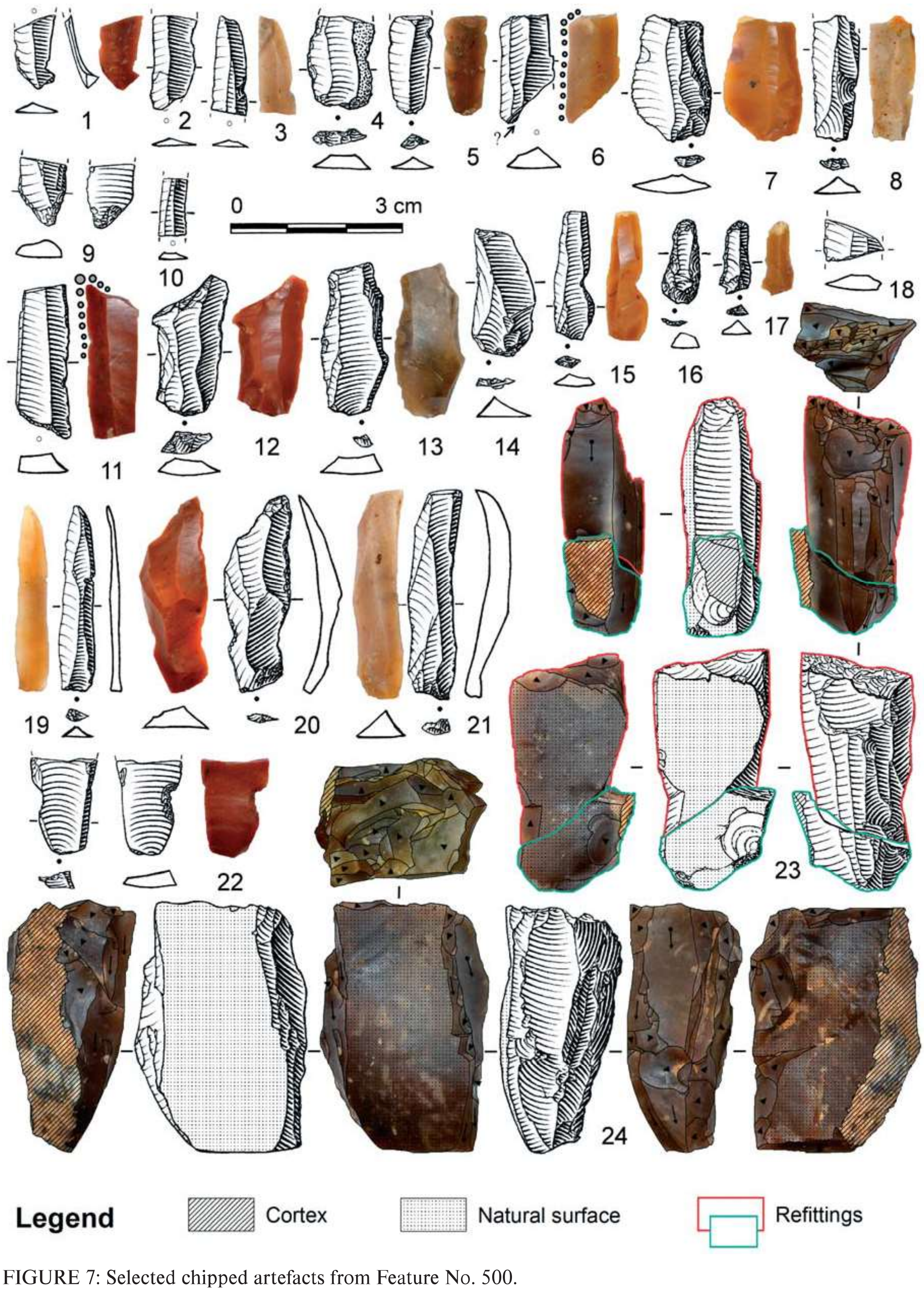

FIGURE 7: Selected chipped artefacts from Feature No. 500.

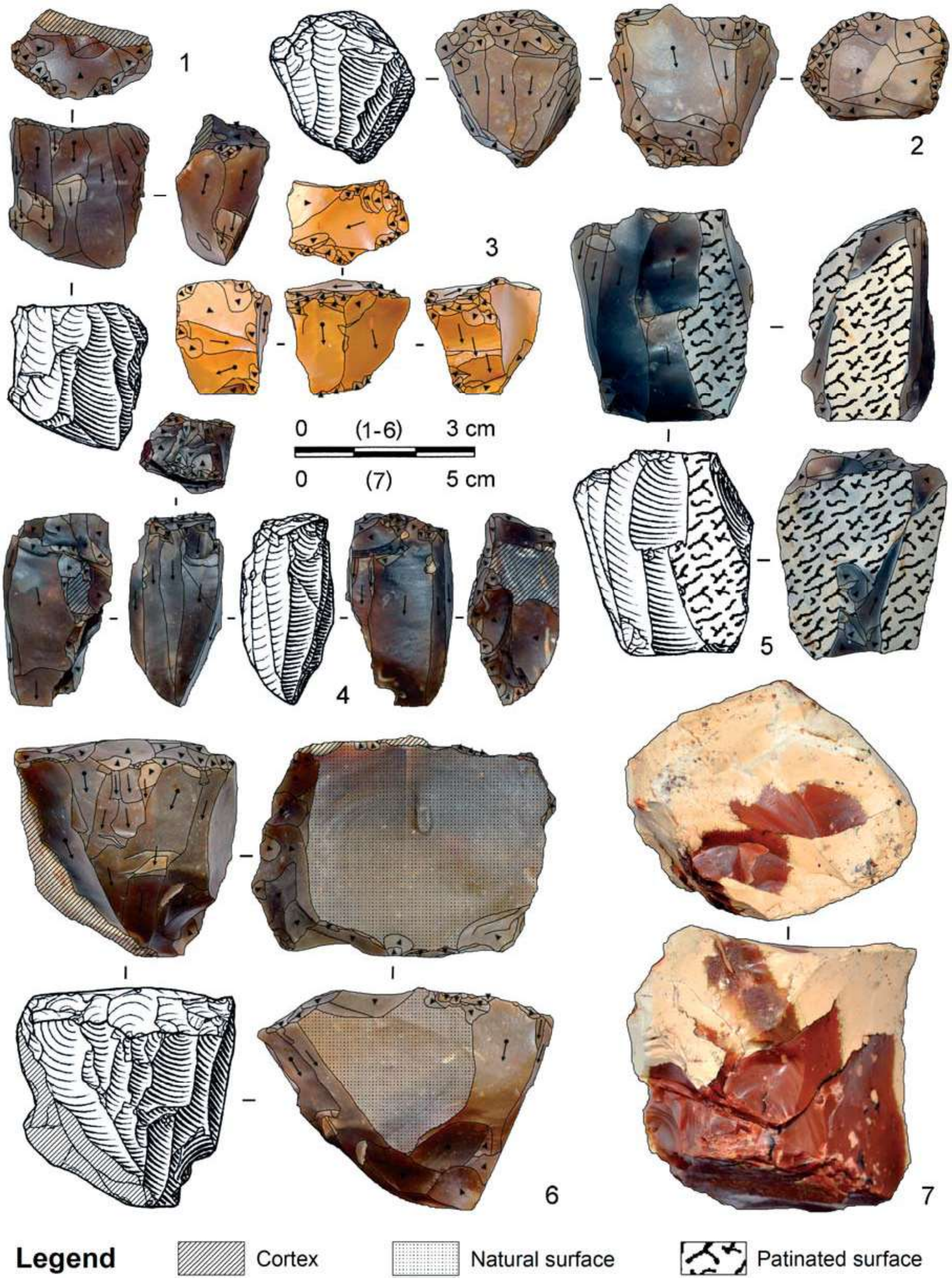

FIGURE 8: Selected cores from the surface collection.

to a strong blow and resulted in core abandonment. Two other refittings were joined within the material from Feature No. 501 and include a broken bladelet made from Kraków-Częstochowa Jurassic silicite (*Figure 10: 4*) and a broken blade made from erratic flint (*Figure 10: 5*). Both artefacts were broken close to their midpoint.

4.3 Typology

The collection of tools from the whole of the analysed contexts consists of 45 items that represent a 6.4% share of the currently available assemblage from the site in interest (*Figure 4*). The tools were documented within all contexts (including a cultural layer and surface collection) except for only partly excavated Feature No. 504. Feature No. 500 contained the highest share of tools (16 items) within the studied assemblage, which is in accordance with the highest number of artefacts in its infill compared to other contexts (*Table 1*). Standardised tools comprise one-third of the assemblage. These are followed by truncated blades, bladelets and retouched tools, supplemented by artefacts with traces of utilisation and gloss (*Table 8*).

The analysis of the distribution of particular tool types indicates differences between individual features. The highest typological diversity is in Feature No. 500, which includes all tool types except for end-scrapers and trapezes, which are documented in Features No. 502 and 503. To what extent the typological differences between the individual features reflect the different activities realised in their vicinity is open to question because the limited area excavated to date does not allow for any detailed analysis of spatial distribution. However, the currently available data suggests the site is important for future excavation and analysis.

Advanced blade technology also influenced the preference for blanks used for tool production within the Spytihněv – "Na vrších" assemblage, where the prevailing part was produced on blades (40%) and bladelets (37.8%) The share of tools produced on flakes (13.3%) and fragments (8.9%) is low.

Only four types of raw material were preferred for tool production (*Table 9*). The prevailing raw materials (both in the number of items and weight) are erratic flint (48.8%) and Bakony radiolarite (37.8%), which are supplemented with Kraków-Częstochowa Jurassic silicite (6.7%) and White Carpathian radiolarite (6.7%).

End scrapers

Different types of end scrapers represent the most frequently occurring group of standardised tools in Spytihněv (Features No. 502 and 503, and a surface collection). Three of these are end scrapers made on

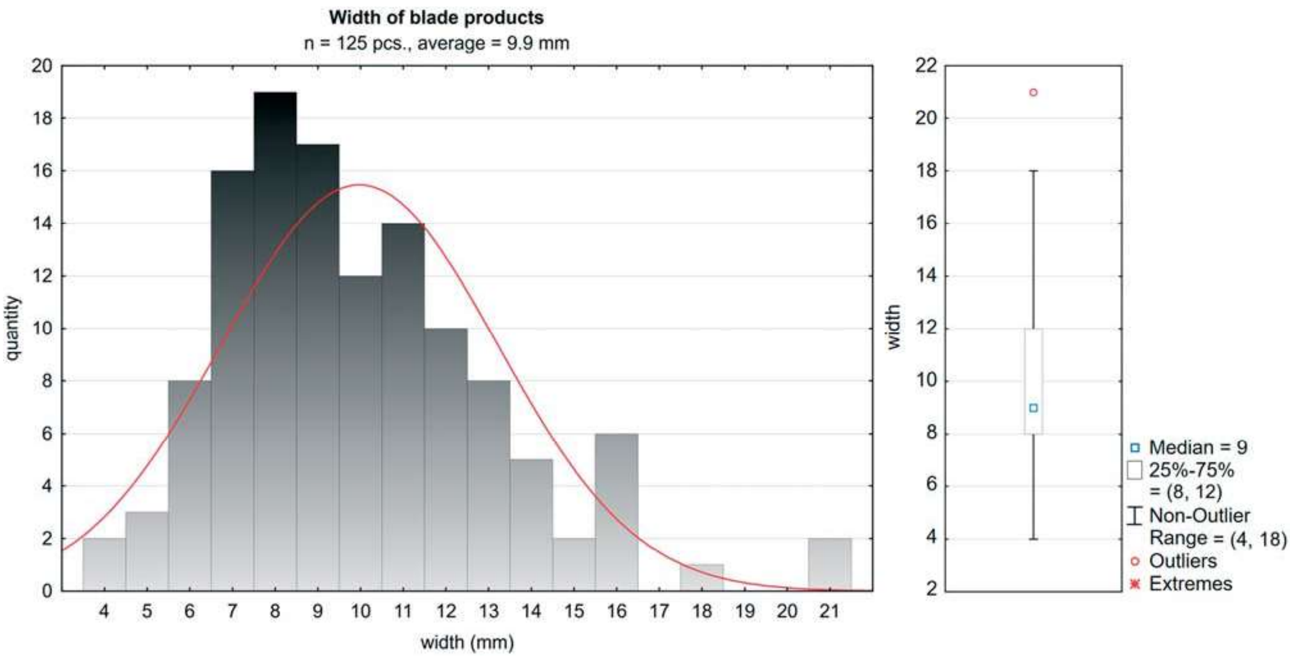

FIGURE 9: Width of blades and bladelets.

TABLE 8: Tools according to individual contexts.

		Context							
Types of tools		**Feature 500**	**Feature 501**	**Feature 502**	**Feature 503**	**Feature 504**	**Cultural layer**	**Surface**	**∑**
Endscrapers	thumb nail endscraper	-	-	-	1	-	-	-	1
	flake endscraper	-	-	-	1	-	-	3	4
	double endscraper with unilateral retouch	-	-	1	-	-	-	-	1
	∑	-	-	1	2	-	1	2	**6**
Notched tools	on a core fragment	1	-	-	-	-	-	-	1
	on a blade	2	-	-	-	-	-	-	2
	∑	3	-	-	-	-	-	-	**3**
Borers/perforators	perforator on a bladelet	1	-	-	1	-	-	-	2
	perforator on a preparation flake	-	-	-	-	-	-	1	1
	∑	1	-	-	1	-	-	1	**3**
Trapezes	short	-	-	1	-	-	-	-	1
	long	-	-	1	-	-	-	-	1
	∑	-	-	2	-	-	-	-	**2**
Burins	dihedral burin	-	-	-	-	-	1	-	1
	∑	-	-	-	-	-	1	-	**1**
Splintered pieces	on a massive blade fragment	-	-	-	-	-	-	1	1
	∑	-	-	-	-	-	-	1	**1**
Fragments of tools	fragment of steep retouched tool	1	-	-	-	-	-	-	1
	∑	1	-	-	-	-	-	-	**1**
Truncated blades	bladelet with transverse straight and unilateral retouch	-	1	-	-	-	-	-	1
	bladelet with transverse oblique retouch	1	-	3	1	-	-	-	5
	blade with transverse straight and unilateral retouch	1	-	-	-	-	-	1	2
	∑	2	1	3	1	-	-	1	**8**
Lateral retouches	bladelet with unilateral retouch	2	-	-	1	-	-	1	4
	backed bladelet	1	-	-	1	-	-	-	2
	blade with unilateral retouch	2	-	1	-	-	-	-	3
	blade with steep bilateral retouch	-	1	-	-	-	-	-	1
	pointed retouched blade	2	-	-	-	-	-	-	2
	flake with unilateral retouch	-	1	-	-	-	-	1	2
	∑	7	2	1	2	-	-	2	**14**
Artefacts with gloss and traces of utilisation	bladelet with lateral cortex and sickle gloss combinated with atypical burin	1	-	-	-	-	-	-	1

	bladelet with transverse straight retouch and gloss on extremity	-	-	-	-	-	1	-	1
	bladelet with transverse oblique retouch and gloss on extremity	1	-	-	-	-	-	-	1
	blade fragment with surface gloss on dorsal side	-	-	1	-	-	-	-	1
	blade fragment with not well developed gloss on lateral edge	-	-	-	-	-	-	1	1
	blade with utilisation retouch and impact on opposite edge (burin?)	-	-	1	-	-	-	-	1
	∑	2	-	2	-	-	-	1	**6**
	∑	**16**	**3**	**9**	**6**	**-**	**2**	**8**	**45**

a flake (*Figure 11: 5, 6, 21*), supplemented by an end scraper made of a massive preparatory flake fragment (*Figure 10: 28*), a thumbnail end scraper (*Figure 10: 25*) and a double end scraper made on a laterally retouched fragment (*Figure 10: 9*). Both these end scrapers have small dimensions and analogies within Mesolithic assemblages (e.g. Valoch 1978, Škrdla *et al.* 1997 etc.). Four items were produced on erratic flint and two on radiolarite (Szentgál type and White Carpathian-type, *Table 9*). The end scraper represents one of the characteristic Early Neolithic tools that together with truncated blades are present in different ratios to each other not only in Moravia but also in Lower Austria and other contemporary cultural contexts throughout the Carpathian Basin (Mateiciucová 2007, 2008 with other ref.).

Notched tools
Feature No. 500 yielded three notched tools – two made on blade blanks from Bakony radiolarite (*Figure 7: 15, 22*) and one on a core fragment from erratic flint.

Borers/perforators
The group of borers/perforators is represented by three items received from different contexts (*Table 8*). Two items were made on bladelets from Kraków-Częstochowa Jurassic silicite (*Figure 7: 16, 10: 23*) and the remaining on an S-shaped preparation flake from Bakony radiolarite (*Figure 11: 20*). The artefacts can be classified as perforators rather than borers as none of them shows an alternate retouch (on dorsal and ventral face). A similar supplementary share of perforators is usual within many Mesolithic and Early Neolithic collections in the Middle Danube area (Mateiciucová 2008: 88–90 with other ref.).

Trapezes
Trapezes, the trapezoidal-shaped artefacts obliquely truncated on both opposed ends, microlithic to macrolithic in dimension, represent a characteristic Early Neolithic tool-type grouped in detail according to their symmetry and metrical parameters (definition and typology, e.g., Kozłowski 1980: 16, Mateiciucová 2008: 178, Niekus 2009: 242; Eigner, Řezáč 2014: 471–

TABLE 9: Tools according to individual raw materials. Abbreviation: EF – erratic flint; BR – Bakony radiolarite; KCJ – Kraków-Częstochowa Jurassic silicite; WCR – White Carpathian radiolarite.

	Raw material					
Type of tools	**EF**	**BR**	**KCJ**	**WCR**	**∑**	**%**
Endscrapers	4	1	-	1	**6**	13.3
Notched tools	1	2	-	-	**3**	6.7
Borers/perforators	1	1	1	-	**3**	6.7
Trapezes	1	1	-	-	**2**	4.4
Burins	1	-	-	-	**1**	2.2
Splintered pieces	1	-	-	-	**1**	2.2
Fragments of tools	1	-	-	-	**1**	2.2
Truncated blades	2	6	-	-	**8**	17.8
Lateral retouches	8	4	1	1	**14**	31.2
Artefacts with gloss and traces of utilisation	2	2	1	1	**6**	13.3
∑	**22**	**17**	**3**	**3**	**45**	100
%	48.8	37.8	6.7	6.7	100	

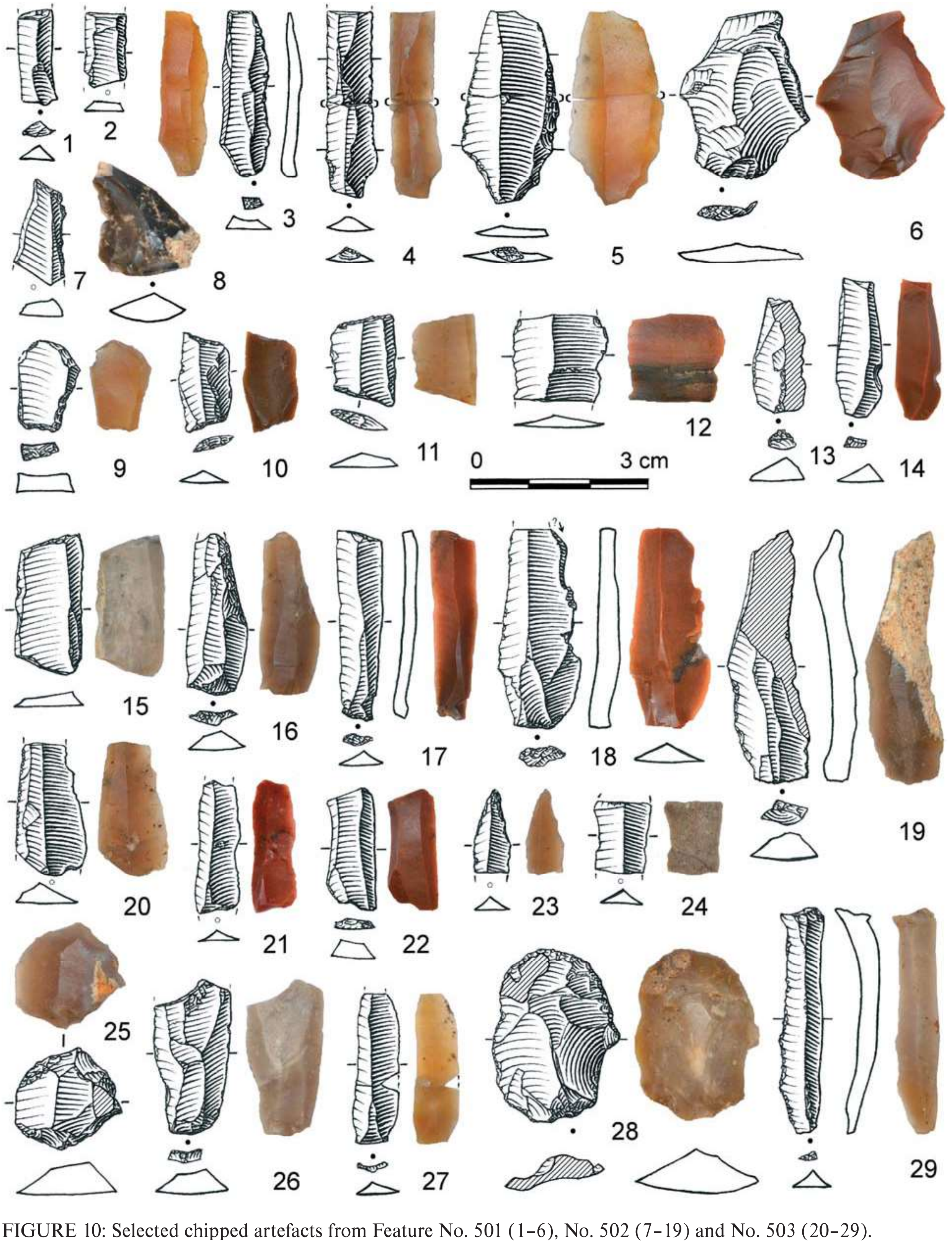

FIGURE 10: Selected chipped artefacts from Feature No. 501 (1–6), No. 502 (7–19) and No. 503 (20–29).

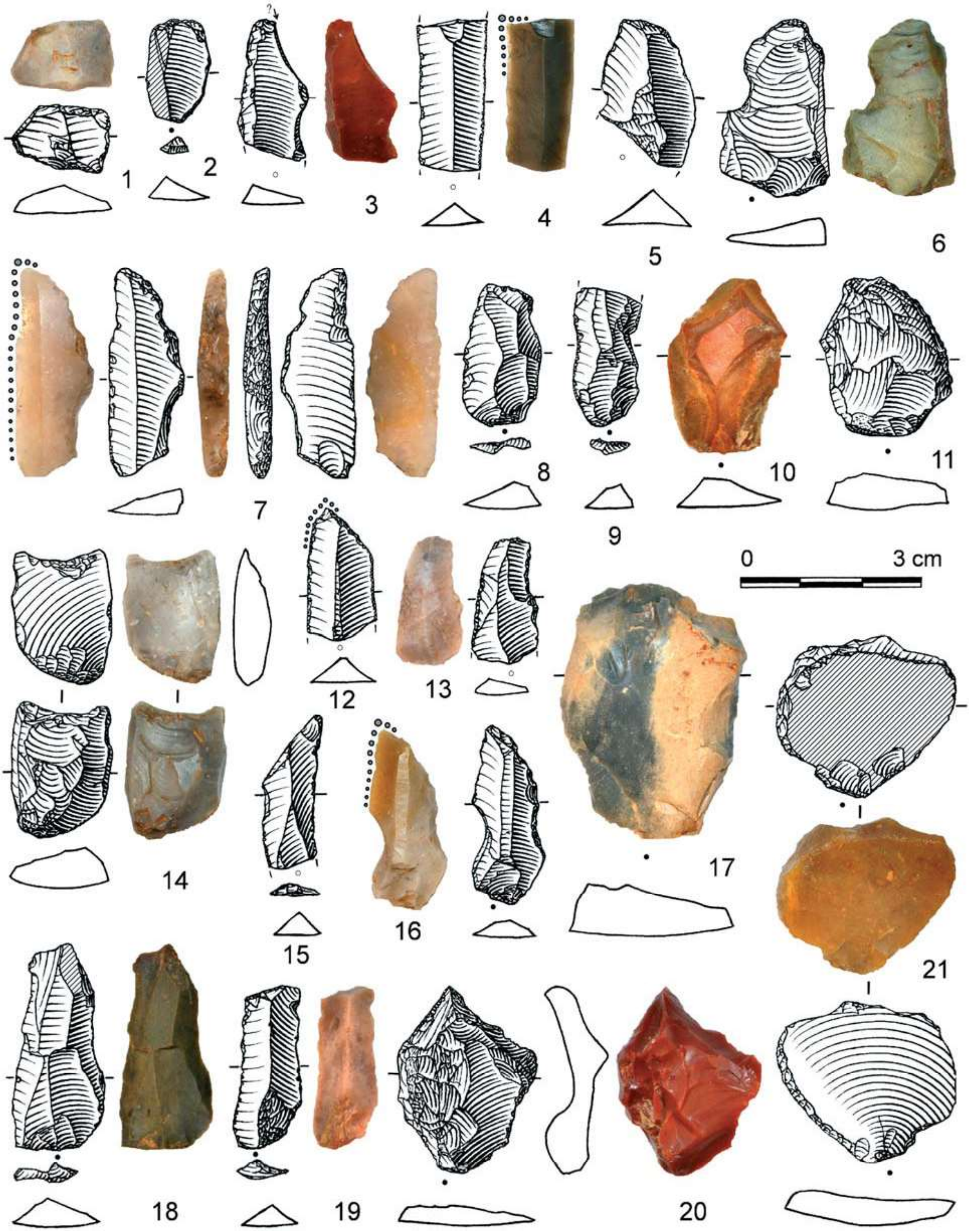

FIGURE 11: Selected chipped artefacts from the surface collection.

472). The Spytihněv – "Na vrších" assemblage yielded only two microlithic-shaped trapezes that can be classified as geometric microliths. Both artefacts are from the Feature No. 502 infill. The first item made from Bakony radiolarite is classified as elongated (type AA; dimensions: 9×17 mm, *Figure 10: 10*) while the second made from erratic flint represents a short trapeze (type AZ; dimensions: 11×16 mm (width×length), *Figure 10: 11*).

Analyses of particular assemblages (e.g. Vedrovice burial ground – Mateiciucová 1998: 86, 2002: 220–222) indicate that the typical trapezes were supplemented or alternated with blade fragments of a similar shape obliquely truncated only on one edge or completely without broken edge modifications (e.g. *Figure 7: 18*). Similar blades with only one truncated edge were also documented in the Spytihněv – "Na vrších" assemblage (e.g. *Figure 10: 15*) although they were not classified as trapezes by authors. Both the above-mentioned trapezes and blade fragments could have been components of composed spears and harpoons or single arrowheads (the use of a bow is assumed) suitable for bird hunting and fishing (e.g. Vencl 1960, Rybakov *et al.* 1989, Piel-Desruisseaux 1990, Nuzhnyj 2000, Beneš 2002, Mateiciucová 2007 etc.).

Trapezes were frequently utilised from the Late Mesolithic (Valoch 1988, Abb. 1. 11, Kertész *et al.* 1994, Taf. III–1, Škrdla *et al.* 1997, Abb. 3. 2, 5, Bánffy 2000a: 175, Marton 2003, Abb. 1. 2–3). Their utilisation continued during the early phases of the Neolithic, where they were frequently documented within many LBK, Körös and Alföld culture assemblages (summarised in Mateiciucová 2007: 692–693 with ref.). However, they were documented to a lesser degree during the Middle and Late Neolithic (e.g. Oliva 1984: 219–221, Fig. 46: 1–5; 1990, Zápotocká, Motyl, Vencl 1997: 597, obr. 9: 17, Zápotocká 1998, Taf. 67: 8–10, Kuča *et al.* 2005: 216, obr. 2, 2012, obr. 6: 6, 7:1, Bartík *et al.* 2014: 35–36, Fig. 8: 1–4 etc.) up to the Early and Middle Eneolithic (e.g. Šebela *et al.* 2007, 250, Fig. 144: 2, 4–5, 149: 1, Bartík *et al.* 2019: 395, Fig. 11: 4–7). Their presence within the above-mentioned Eneolithic assemblages is considered to be indirect evidence of increased hunting (cf. Kyselý 2012).

Burins

Different forms of burins are regularly reported in Early LBK (e.g. Kaczanowska *et al.* 1987, Kozłowski 1989b, Gronenborn 1997, Kaczanowska, Kozłowski 1997, Mateiciucová 2007, 2008, Nerudová, Přichystal 2012) although the share is small and distinguishing between an intentional burin blow and impact damage resulting from utilisation is often difficult. A similar situation was documented in the Spytihněv – "Na vrších" assemblage – one clear burin is supplemented with two items that so far, remain unclear. The clear burin – dihedral – is made on a bladelet with a lateral cortex from erratic flint. The burin was rejuvenated by further spalls detachments along the longitudinal axis. The artefact was found in the cultural layer excavated in 2016. The unclear burins include a blade with a broken proximal end and lateral use wear with an impact blow (*Figure 10: 18*, Feature No. 502) and a middle part of a blade with a lateral cortex that has sickle gloss on one lateral edge and a possible burin blow on the opposite edge (*Figure 7: 6,* Feature No. 500). A Bakony radiolarite artefact, where the shape suggests burin spall, indirectly indicates the presence of another burin (Feature No. 502). In addition, several broken blades with atypical scars may also represent atypical burins (e.g. *Figure 11: 3*).

Splintered pieces

Only a single splintered tool was identified within the Spytihněv – "Na vrších" assemblage. This artefact has typical bifacial scars on two opposite ends (in a long axis) and is made from erratic flint (*Figure 11: 14*). The splintered artefact may have served in different ways and the interpretation of these artefacts is therefore not uniform – while some authors interpret them in the LBK technology as chisels for working wood and other hard materials (e.g. Małecka-Kukawka 2001: 139), others are inclined to interpret them as bifacial anwil cores used for the production of blanks using the splinting technique (Kaczanowska 1987: 176; Małecka-Kukawka 1992: 29; Mateiciucová 2008: 96–97).

Fragments of tools

An undiagnosed fragment of a steeply retouched artefact from erratic flint excavated from Feature No. 500 supplements the collection of tools.

Truncated blades and lateral retouches

The standardised tools are supplemented by a relatively numerous and variable group of truncated blades, bladelets, and laterally retouched artefacts. Truncated artefacts include truncated blades and more frequently bladelets (including their fragments) with straight (*Figure 7: 7*) or oblique (*Figure 7: 12, 10: 15, 17, 11: 15, 16, 19*) truncation. In the case of three items, the artefacts are also laterally retouched (*Figure 7: 7, 10: 7, 11: 12*). Truncated blades and bladelets were produced from Bakony radiolarite (6 items) and erratic flint (2 items). They were regularly distributed within all the studied contexts (*Table 8*). As mentioned above, several trapezoidal blades obliquely truncated on only a single edge (*Figure 10: 15*) may have had a similar function to trapezes.

The group of retouched tools consists of 14 artefacts and include laterally retouched blades and bladelets (*Figure 7: 4, 13, 10: 20, 29*), a bilaterally retouched blade (*Figure 11: 13*), backed bladelets (one of them an arched backed bladelet, *Figure 7: 17, 11: 7*), two blades retouched into a point (*Figure 7: 9, 20*), and a retouched flake (*Figure 10: 6*). The prevailing raw material of the retouched artefacts was erratic flint, other raw materials were used to a lesser degree (*Table 9*).

Artefacts with gloss and traces of utilisation

The last group of tools represents different artefacts with traces of gloss, often combined with other traces of utilisation. Besides the above-mentioned bladelet with a possible burin blow and lateral gloss (*Figure 7: 6*), this group includes a middle fragment of an obliquely truncated bladelet with a distinctive gloss on its edge (*Figure 7: 11*), a proximal blade fragment with an intensively worn edge and gloss partly covering its dorsal face and a middle part of a blade with weakly developed lateral gloss (*Figure 11: 4*).

The blades showing gloss were produced from all four of the above-mentioned raw material types utilised for tool production (*Table 9*). Only an artefact with intensive gloss located at the extremity can be demonstrably identified as a sickle insert. Gloss on the other artefacts is not as intensive and may have originated from their use as knives for cutting various organic materials.

4.4 Dating

As both excavations and surface surveys have not yet indicated other Neolithic components, the Spytihněv – "Na vrších" site is most probably comprised of one component – the earliest LBK. Only the find of a bronze dagger fragment indicates certain activity in the Late Bronze Age. The preliminary analysis of excavated pottery supports the above-mentioned one component hypothesis and allows to date an occupation to the LBK Ia phase based on relative chronology (Tichý 1960, 1962, Čižmář 1998).

Contrary to other sites within the middle course of the Morava River as well as within the majority of Moravian settlement micro-regions, where earliest LBK occupation continued to its later phase (Vaškových 2006, *et al.* 2008: 298, Langová 2011: 242), the presence of fine-grained pottery and note decoration are absent in Spytihněv – "Na vrších". However, this observation should take into consideration the limited excavated area (37 m^2).

The assignment to the Ia phase based on relative chronology is supported with radiocarbon dates from charcoal samples. The sample collected within Feature No. 500 yielded the date 6340±40 BP (Poz-21786; Schenk *et al.* 2008) and the sample collected within Feature No. 501 yielded the date 6420±40 BP (Poz-87122). After calibration using the CalPal software pack, ver. 2021.2 (Weninger, Jöris 2008) on the IntCal 2020 calibration curve (Reimer *et al.* 2020), the resulting dates are 5300±59 cal. BC (Feature No. 500) and 5397±53 cal. BC (Feature No. 501), and their probability distributions significantly overlap.

We can conclude that LBK occupation in Spytihněv – "Na vrších" began at the very beginning of the second half of 6th Millennium BC (*Figure 12*), which corresponds with other available Moravian dates (Brno-Ivanovice – 6545±40 BP, Mateiciucová 2008, Kladníky – 6390±40 BP and 6330±40 BP, Kuča *et al.* 2012, Žopy – 6430±100 BP, Felber, Rutkay 1983, a series of dates from Mohelnice, where the earliest date is 6580±75 BP, Peška 2020) as well as Lower Austrian dates (cf. Lenneis *et al.* 1996, 2009, Stadler 1995, 2005).

The probability distribution of the Spytihněv – "Na vrších" dates partly overlaps with some of the earliest dates from the Vedrovice burial site (Pettitt, Hedges 2008) that is expected to belong to the LBK Ib phase (Čižmář 2002). However, in general, the partial chronological overlap of both phases (Ia and Ib) reflects the relative chronology (built on pottery analysis) limits and is currently interpreted as regional diversification or based on socioeconomic differences (Kuča *et al.* 2012, Trampota, Květina 2020).

5. DISCUSSION

The Spytihněv – "Na vrších" Early Neolithic site is unique because of its topographic position – a strategical elevation above the Napajedla Gate that allows control of the surrounding landscape. The currently available highly fragmentary data concerning local pre-Neolithic (Mesolithic) occupation do not allow a study to what extent this – for the Neolithic

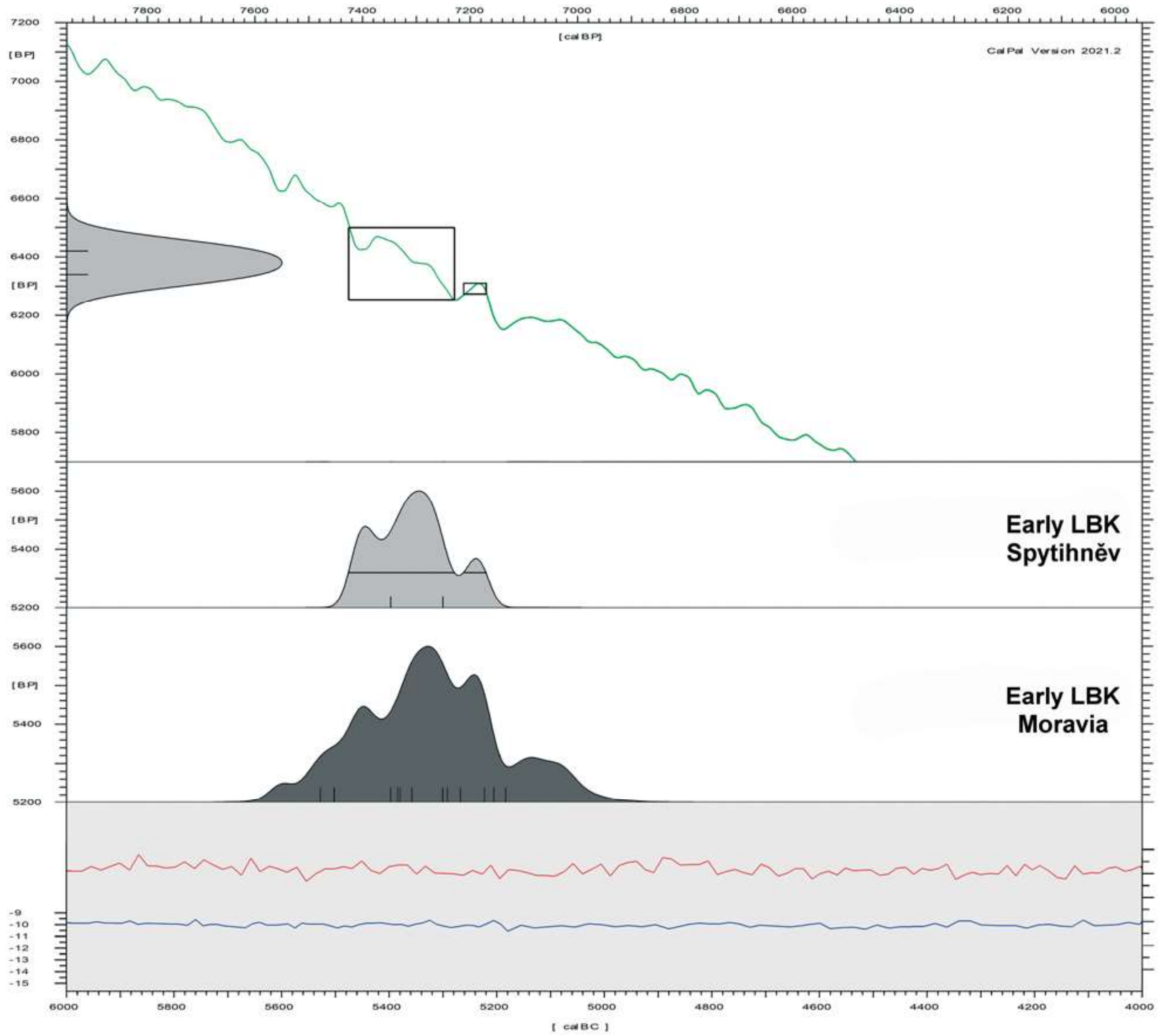

FIGURE 12: AMS dates for Spytihněv and other Early LBK Moravian sites.

settlement strategy unusual topographic position – reflects a possible connection with previous activities in this place. In general, the number of Mesolithic sites is low in Moravia (cf. Eigner, Bartík 2016: 72, Abb. 1, Oliva 2018: 5, Fig. 1) and only isolated assemblages that are not culturally and chronologically clear are known within the middle course of the Morava River (e.g. Uherský Ostroh – "Borešín", Hrubý, Pavelčík 1992: 114), Luhačovice (Klíma 1963, Pavelčík 1995: 93–99), Korytná – "Padělky, U hřbitova" (Pavelčík 1990: 21, 1995: 99, 101), and Šumice (unpublished collection of R. Symčák) located deep in the White Carpathians. There is no Mesolithic collection known near Spytihněv yet. Surface collections in the middle course of Okluky Creek (c. 22 km SSE from Spytihněv) are probably Late Paleolithic rather than Mesolithic in age (Škrdla, Ježek 2009) as well as two isolated burins from Uherské Hradiště – Jarošov (c. 8.8 km S from Spytihněv, Škrdla 2002: 148). While there are only typological indices allowing the classification of probably inhomogeneous Mikulčice and Příbor collections (Oliva 2018: 25) to the Late Mesolithic, the presence of Late Mesolithic miners is well documented by a series of radiocarbon dates in

Krumlovský les (Oliva 2015a). There is no sufficient data that allow a study of possible Late Mesolithic – Early Neolithic interactions in the region yet.

The second question concerning the unusual strategic position of the site concerns its function within regional and supraregional raw material networks – possible control over import and the further distribution of individual raw materials. The industry in Spytihněv is characterised by prevailing erratic flint, while the LBK sites to the north of Napajedla Gate are characterised by prevailing Kraków-Częstochowa Jurassic silicite (Kladníky, Žopy, Mohelnice, cf. Mateiciucová 2008: 128), which is the raw material in the third position in Spytihněv (*Table 10*). The prevalence of Kraków-Częstochowa Jurassic silicite characterises Late LBK sites in the middle course of the Morava River region (e.g. Buchlovice – "Loučky", Kostelany – "Roztoky", Spytihněv – "Němeča", Velehrad – "Na nivách", Veletiny – "Losky", Zlín-Malenovice – "Zadní mezicestí", etc.).

The important raw material is Eastern Slovakian obsidian, as it is missing in other Moravian Early LBK collections (*Table 10*). A possible exception is several items from the multi-period site at Mohelnice, settled since LBK Ia although obsidian tends to be connected with later Neolithic occupation (Mateiciucová 2008: 136, 2020: 157). The obsidian outcrops are in southeastern Slovakia (Přichystal, Škrdla 2014, Bača *et al.* 2017, Kaminská 2021), and there were two possible routes to Moravia – a northeastern route through Little Poland (connected with the Kraków-Częstochowa Jurassic silicite distribution route) or a southeastern route through the Carpathian Basin and following the Danube River (connected with the Bakony radiolarite distribution network). While obsidian is present within LBK Ia collections at Southern Polish sites and missing at Burgenland, Lower Austria and Southern Moravia (cf. Kaczanowska, Lech 1977: 9, Mateiciucová 2008: 136), the currently available data favour the Polish route. The import of obsidian to the middle course of the Morava River area also continued during the later phases of LBK culture (e.g. Březolupy – "Chrástka", Veletiny – "Losky", Zlín-Malenovice – "Zadní Mezicestí", and other small collections from the Dřevnice River catchment area).

The increased share (when compared to other Moravian Neolithic sites) of Bakony radiolarite within the raw material spectrum represents another important feature of the Spytihněv collection. This raw material is present as blades and tools supplemented with numerous waste indicating local production and a raw material block (weight over 300 g), which is unique in Moravia and indicates the import of this raw material in the form of large natural blocks with test scars or pre-cores. We can hypothesize the role of the Spytihněw site as a local redistribution centre, which is supported by the highest share of Bakony radiolarite from all the Moravian Early Neolithic sites in Moravia (cf. Mateiciucová 2008). This was a complete operational chain resulting in debitage and tools that were exported and documented as single items within other Early LBK collections in the middle course of the Morava River (e.g. Spytihněv – "Němeča", Uherský Ostroh – "Padělky", Žádovice etc.).

The presence of Bakony radiolarites within individual Early Neolithic collections (Mateiciucová 2008: 281–282, Farbtafel 10: 1) show a non-hierarchic (down-the-line) distribution pattern (see Renfrew 1969, Bahn, Renfrew 1998: 355) where the share of raw material continually decreases as the distance from its source increases. The share of Bakony radiolarites within the Early LBK collections reach the highest values (40–60%, Přichystal 2006: 359, Mateiciucová 2008: 192, 206) at the Lower Austrian sites (e.g. Rosenburg I, Brunn II, in a minimum distance of 160 km from outcrops), reach slightly over 20% at Spytihněv (*Table 1*, at a distance of c. 230 km from outcrops), and continually decrease with the increasing distance from outcrops in a northern direction (Žopy 14.5%, c. 250 km from outcrops, Kladníky 1.7%, c. 265 km from outcrops, Mohelnice, probably <2%, c. 300 km from outcrops, Mateiciucová 2008: 118–119, 219–220, 263–265, 2020: 156–157). The Bakony radiolarites that are present as single items are within Early LBK sites located west and northwest from Spytihněv (e.g. Boskovštejn III, Brno-Ivanovice, Mohelno, Slavětice, Třebelovice, Vedrovice, Výčapy, Žádovice etc., Vokáč 2003, Mateiciucová 2001a, 2001b, 2008, Nerudová 2011, Knotková 2011, Bartík 2014). The current state of art indicates a secondary workshop function for the Spytihněv site – a similar type of production-consumption site as recently described for Kraków-Częstochowa Jurassic silicite at Odra Gate (Janák *et al.* 2014, Oliva 2015b).

The Bakony radiolarites distribution network reached hundreds of kilometres as indicated by single items also recognized within Early LBK collections in Bohemia (Lech 1989: 112, Pavlů, Rulf 1996: 647, Končelová, Burgert 2015: 149–150) and very distant Central Germany (Mateiciucová 2008: 118–119).

There is an obvious dichotomy in the raw material composition of the Early Neolithic collections between the Morava River area and Southern Moravian sites within the Dyje River catchment area. While the south Moravian assemblages (Brno-Ivanovice, Vedrovice and other surface collections) are characterised by prevailing local raw materials primarily including Krumlovský les-type chert and Olomučany-type chert (*Table 10*) and distant raw materials are represented in single per cent, the Middle Morava River area collections are characterised by a high share of imported raw materials. These differences could have been influenced by several factors. The first reflects the different geographic locations of both regions with consideration of their connection to supraregional communication routes. The Morava River area is part of the pan-European route connecting the Danube River with the North European Plains and allowed the migration of people, the flow of ideas, and the transport of raw materials before the Neolithic (see Škrdla 2005: 10). The second factor represents raw material availability. While the Dyje River catchment area is rich in local knapping raw materials, high-quality local materials are missing in the middle course of the Morava River area (except for White Carpathian radiolarite) and were necessary to be imported (for practical as well as symbolic reasons) from more distant sources.

The dominance in local raw materials, as in the case of Krumlovský les chert, in particular, could have been influenced by many socioeconomic factors and continued the tradition of earlier (Mesolithic) exploitation of Krumlovský les chert (Oliva 2015a, 2018, 2020).

An important import is the Želešice type Metabasic rocks from the primary outcrops in Želešice near Brno. This raw material was frequently utilised for the polished industry during the Late Neolithic and Early Eneolithic (Přichystal 2009: 180, Bartík *et al.* 2015: 47). The Želešice type Metabasic rocks were only utilised near the outcrops in the Brno area during the Early Neolithic and its export to Spytihněv (c. 70 km) indicates contact between both areas (in reverse to the export of Bakony radiolarite).

The contact of the Morava River area with the Váh River Valley, probably through the White Carpathian passes, indicates isolated artefacts made from limnosilicite from southwestern Slovakian sources (in addition to Spytihněv, also in Žopy – "Cihelna", Mateiciucová 2008: 263–264).

Different forms of primary technological data (both quality and quantity) complicate the comparison of Spytihněv with other Moravian Early Neolithic collections. Contrary to Spytihněv, the remaining LBK collections are significantly smaller (*Table 10*) and

TABLE 10: Raw material spectra for individual Early Neolithic sites in Moravia (data according to Mateiciucová 2008).

Raw material (pc.)	**Spytihněv**	**Vedrovice**	**Kladníky**	**Žopy**	**Brno-Ivanovice**	∑
Erratic flint	399	1	28	5	2	435
Bakony radiolarite	166	4	1	11	1	183
Kraków-Częstochowa Jurassic silicite	86	3	83	48	1	221
White Carpathian radiolarite	29	-	-	-	-	29
Obsidian	11	-	-	-	-	11
Quarzit	5	-	-	-	-	5
Olomučany-type chert	-	47	-	-	34	81
Moravian Jurrasic chert	-	2	-	-	5	7
Krumlovský les I – type chert	10	166	-	1	1	178
Krumlovský les II – type chert	-	25	-	-	3	28
Quatz	-	1	-	2	1	4
Limnosilicite	1	-	-	3	-	4
Other	1	6	11	6	-	24
Undefined	11	-	2	-	2	15
∑	**719**	**255**	**125**	**76**	**50**	**1,225**

selective (incomplete operational chain), which complicates the comparison between individual collections. The above-mentioned disproportion is caused by the different excavation methodology applied at Spytihněv – complete wet sieving of excavated sediment.

Prevailing single platform cores for the production of blades and bladelets is a characteristic feature in all the collections. The preparation of a striking platform, often by a series of small flake removals, resulted in blanks with faceted platforms, which were (besides at Spytihněv) also documented in Brno-Ivanovice (Mateiciucová 2008, Fig. 15: 8), Kladníky (Mateiciucová 2008, Fig. 16: 3, 6, 17: 1, 6, 7, 10), Vedrovice (Mateiciucová 2008, Fig. 14: 3, 5, 7, 13, 14, 16), and Žopy (Mateiciucová 2008, Fig. 40: 1, 2). In addition, blanks with facetted platforms were also identified in Lower Austrian and Hungarian Early Neolithic assemblages (cf. Mateiciucová 2008, Fig. 12, 44). Typological spectra are similar and homogeneous – no preference for a specific tool type or group of tools were documented in any individual collection. In all the cases, the prevailing tool types were laterally retouched blades (and fewer flakes), truncated blades, and end scrapers. On the contrary, the presence of splintered pieces and burins was low (*Table 11*).

6. CONCLUSION

The Spytihněv – "Na vrších" hilltop site represents one of the most important and promising Early Neolithic sites in Moravia. The site is unique not only because of its unusual location but also because of its lithic assemblage made on prevailing imported raw materials. The siliceous rocks were imported to Spytihněv – "Na vrších" from different directions and the site represents an imaginary knotting point where those different raw material routes met. Its specific position within the Moravian Early Neolithic sites could be influenced by its location within an supraregional communication corridor connecting the Vistula River catchment area with the Danube River catchment area known as the "Amber Route", which connected the Baltic and Mediterranean coasts in later prehistory (since the Bronze Age, e.g. de Navarro 1925, Chytráček *et al.* 2017).

The Lithic collection is characterised by erratic flint prevailing over Kraków-Częstochowa Jurassic silicite, a significant share of Bakony radiolarite, and the presence of obsidian. Bakony radiolarite is connected with Early LBK spreading into Central Europe (Mateiciucová 2010: 281–282). This raw material is present in all parts of the operational chain (including raw material with test scars, blade blanks, tools, flakes

TABLE 11: Tool spectra for individual Early Neolithic sites in Moravia (data according to Mateiciucová 2008).

Tools (pc.)	Spytihněv	Kladníky	Žopy	Vedrovice	Brno-Ivanovice	∑
Lateral retouches	14	4	2	-	2	22
Truncated blades	8	8	1	-	-	17
Endscrapers	6	4	4	2	-	16
Combination of tools and artefacts with gloss and traces of utilisation	6	1	2	-	1	10
Borers and perforators	3	3	-	1	-	7
Notches and denticulates	3	1	1	2	-	7
Sidescrapers	-	3	2	2	-	7
Tool fragments	1	3	2	1	-	7
Trapezes	2	-	1	3	-	6
Splintered pieces	1	-	-	-	1	2
Burins	1	-	-	1	-	2
∑	**45**	**27**	**15**	**12**	**4**	**103**

and small waste) in Spytihněv – "Na vrších", which is a unique feature within Moravian Early LBK collections. We cannot exclude its function as a regional redistribution centre.

The technology is characterised by blade and bladelet production removed using a punch from the prevailing single platform cores. The striking platforms were frequently faceted. The erratic flint nodules were initiated from a natural surface or a prepared crest. Several core residuals show the initialisation of a secondary platform and the production of small flake removals in the final stage of core life. The metric analyses of cores, debitage, and tools indicate the small dimensional character of the industry. Blades and bladelets represent the prevailing blanks utilised for modification into tools. The typological spectrum contains characteristic tools such as small trapezes, truncated blades and small nail-shaped end-scrapers that refer to the older Mesolithic tradition. Both the technological and typological characteristics generally fit with the Early Neolithic industries within the Middle Danube area (cf. Mateiciucová 2008).

The above-described new data are important for analyses of settlement patterns and raw material distribution networks. The Spytihněv – "Na vrších" site is currently a Moravian Early Neolithic site and would be a key site for future research targeted at a better understanding of the Neolithisation process in Central Europe.

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