

NEW DATA IN RESEARCH ON ABSOLUTE CHRONOLOGY OF THE BADEN CULTURE IN LESSER POLAND

Albert ZASTAWNY

Dr. Albert Zastawny
Archaeological Museum in Kraków
Senacka 3
31-002 Kraków, Poland
albertzastawny@gmail.com
ORCID ID: 0000-0003-4747-330X
WoS Researcher ID: EHB-8971-2022
SCOPUS Author ID: 57194506033

ZASTAWNY, Albert. *Nové dáta z výskumu absolútnej chronológie badenskej kultúry v Malopoľsku*. In *Studia Historica Nitriensia*, 2023, vol. 27, Supplementum 3 – V hore strom, pp. 35-46, ISSN 1338-7219, DOI: 10.17846/SHN.2023.27.S.35-46.

Článok prezentuje najnovšie výsledky rádiouhlíkového datovania zo vzoriek zvieracích kostí z troch lokalít badenskej kultúry v Malopoľsku: Kraków-Pleszów 17-20, Igołomia 1, Smardzowice 38. Tieto nové údaje rozšírili počet doteraz známych 23 ¹⁴C AMS dát. Zistené výsledky sú zaujímavé a dôležité. Pre badenskú kultúru v Malopoľsku pochádza doposiaľ najstarší údaj z Krakowa-Pleszowa (4450,40 BP). Vzorky zo Smardzowic a Igołomi sú naopak najmladšie (4290,30 BP, 4265,35 BP). Takto získané výsledky stanovili časový rámec vyvoja badenskej kultúry v oblastiach severne od Karpát.

Kľúčové slová: Eneolit, Malopoľsko, badenska kultúra, absolútna chronológia, ¹⁴C AMS datovanie;

Keywords: Eneolithic, Lesser Poland, Baden culture, absolute chronology, radiocarbon dating;

Introduction

The state of research on the absolute chronology of the Baden culture in Lesser Poland has clearly improved in the last few years. However, compared to other Eneolithic cultures of this region, the sources for analyzing radiocarbon chronology of the culture in question are still not numerous. There are currently 26 published radiocarbon dates (including the dates discussed in this article) that can be reliably associated with the Baden culture. In assessing their representativeness, it is advantageous that they come from as many as 15 sites, located in all the most important zones of the Baden settlement in Lesser Poland (Fig. 1). As a result of undertaking chronological studies published in 2015 (Zastawny 2015a, 191-219; 2015b, 87-123), which included 22 dates available at that time, the chronological framework for the development of the research culture in Lesser Poland was estimated. This period covers the years 3330 – 2870 BC (all ranges are taken for a 68.2 % probability) and 3124 – 2870 BC (the most probable ranges are taken for a 68.2 % probability). According to the cited results, the settlement of the Baden culture in the discussed region did not last longer than 150 – 250 years (Zastawny 2015b, 100).

This article presents three new radiocarbon measurements for the Baden culture of the region. They were obtained from animal bones from three sites explored at different times. The obtained dates turned out to be a significant supplement to the state of research on the absolute chronology of the Baden culture in Lesser Poland. The results of radiocarbon dating (Table 1, Fig. 2) were part of a Polish-Slovak research project carried out at the National Science Centre Poland in 2014 – 2017 (NCN-2013/09/B/HS3/03401).

New radiocarbon dates for the Baden culture

Animal bones from three sites were selected for research: Kraków-Pleszów, site 17-20, Igołomia, site 1, Smardzowice, site 38. In the case of Kraków-Pleszów and Igołomia, the samples for radiocarbon analyzes came from old excavations carried out in 1953 and 1954. The sample from Smardzowice was taken during the rescue excavations in 2014. The results of dating from Kraków-Pleszów and Igołomia have not been published so far. The date from Smardzowice was presented in 2017 as brief information without illustrating the context of the sample discovery and analysis (Zastawny/Horoáthová 2017, ryc. 3). All samples were analyzed in the Poznań Radiocarbon Laboratory and calibrated in OxCal v4.4.4.

Kraków-Pleszów, site 17-20

Pleszów is located today in the eastern part of Kraków and belongs to the district called Nowa Huta (Fig. 1). The result of many years of excavations carried out in 1952 – 1981 (Bielenin 1959, 63-76; Godłowska 1976, 7-180; Godłowska/Kaczanowska 1975, 42; Rook 1971, 111-236) was the discovery of the largest settlement site of the Baden culture in Lesser Poland so far. It covered an area of approximately 5 hectares. In the entire area of the site, divided into several parts, a total of over 190 settlement pits, including two human burials, were discovered.

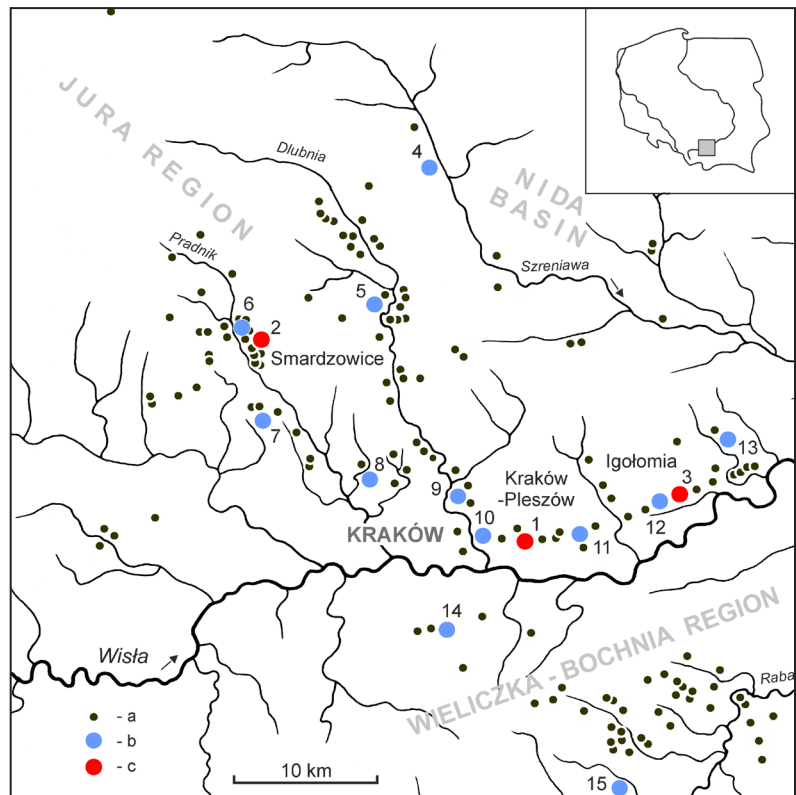


Fig. 1. Location of the Baden culture sites in Lesser Poland: a – settlement sites; b – settlement sites with ¹⁴C dates; c – sites with new radiocarbon dates. 1 – Kraków-Pleszów 17-20; 2 – Smardzowice 38; 3 – Igołomia 1; 4 – Smroków 17; 5 – Iwanowice 1; 6 – Ojców 18; 7 – Modlnica 1; 8 – Kraków-Witkowice II; 9 – Kraków-Zestawice 21; 10 – Kraków-Mogiła 55; 11 – Kraków-Wyciąże 5; 12 – Zofipole 1; 13 – Stręgorzyce 4; 14 – Kraków-Bieżanów 8; 15 – Gdów 2. Illustration: A. Zastawny.

Table 1. New results of age measurement for materials of the Baden culture in Lesser Poland.

Site name and No	No. and function of feature	Sample	Lab. no.	BP	calBC	
					OxCal v4.4.4 (Bronk Ramsey 2021); r:5	IntCal 20 (Reimer et al. 2020)
Kraków-Pleszów site 17-20	155 settlement pit	animal bone (dog)	Poz-78058	4450 ± 40	68.3 %	95.4 %
					3326 BC (31.7%) 3231 BC	3338 BC (38.6%) 3208 BC
					3181 BC (7.0%) 3156 BC	3196 BC (50.6%) 3008 BC
Smardzowice site 38 Kraków district	1 settlement pit	animal bone (cattle)	Poz-70506	4290 ± 30	68.3 %	95.4 %
					2914 BC (68.3%) 2888 BC	3010 BC (6.0%) 2980 BC
					2962 BC (1.1%) 2950 BC	2938 BC (88.3%) 2876 BC
Igołomia site 1 Kraków district	29 settlement pit	animal bone (large mammal)	Poz-77995	4265 ± 35	68.3 %	95.4 %
					2912 BC (68.3%) 2877 BC	3006 BC (1.4%) 2990 BC
						2929 BC (79.8%) 2860 BC
					2806 BC (12.1%) 2754 BC	
					2721 BC (2.1%) 2702 BC	

Feature 155, from which the material for dating was collected, was located in the eastern part of the settlement (site 17), in a grouping of several dozen pits, evenly spaced, at quite large distances from each other (Fig. 3: 6). In the immediate vicinity of feature 155, several pits of a similar nature were discovered, together forming a small cluster.

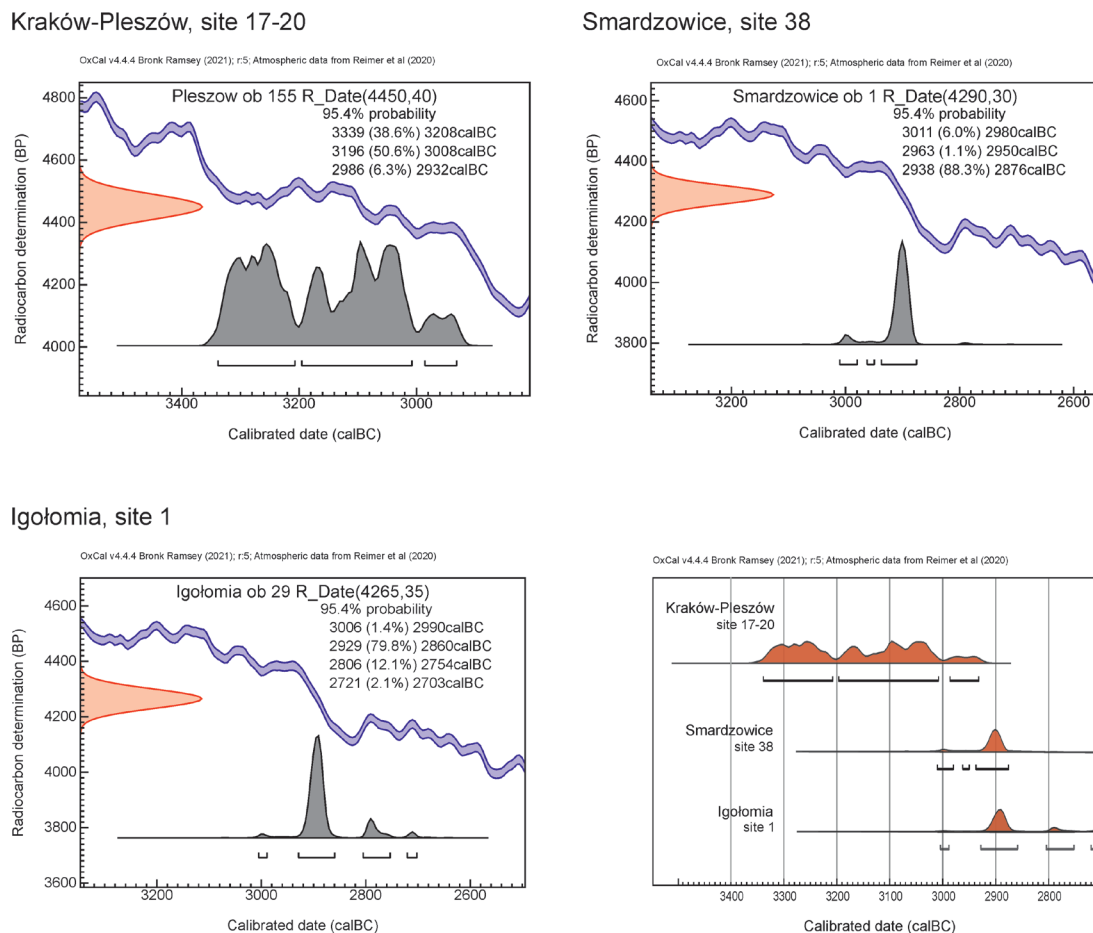


Fig. 2. New radiocarbon dates of the Baden culture projected on the calibration curve IntCal20.

An animal bone (a fragment of the dog's mandible) was submitted for research and the result was 4450.40 BP /Poz-78058/ (Table 1; Fig. 2). After calibration the date marks the range of 3338 – 2932 BC (95.4 %) and 3326 – 3022 BC (68.3 %). Material was taken from the bottom of feature 155 at a depth of 140 – 160 cm (Fig. 3). This feature was discovered during excavations in 1954, conducted by S. Buratyński (*Rook 1971, 141*). It had an oval shape in plan view with dimensions of 190 x 140 cm and in the cross section the outline was similar to a trapezoidal one. The flat bottom was documented at a depth of 160 cm. The lower part of the pit was filled with black-brown soil with an admixture of daub and patches of yellow loess (Fig. 3: 1). Over 260 pieces of pottery have been discovered in the pit. Most of the fragments belong to cups with tape-shaped handles, decorated with vertical grooves or without ornament, semi-spherical bowls decorated with grooves in the arrangement of „hanging triangles“ and fingerprints, pots with traces of surface smearing, and wide-opening vessels with an “oblique grille” ornament (Fig. 3: 2-5; *Rook 1971, Plate XXVII: 10*). Apart from ceramics, the inventory includes flint artefacts, a series of bone tools, shells and daub (*Rook 1971, 141, Plate XXIX*).

The date from Pleszów presented in the article is the third age measurement for the Baden culture from this site. The first two were published in 1986: BP 4445.60; 4430.40 BP (*Godłowska 1986, 49-58*). The materials of the Baden culture from the settlement in question have not yet been fully elaborated. Most of them were published in the 1970s and 1980s (*Godłowska 1976, 56-64, Plate XXV-XXVIII; 1986, 49-58; Rook 1971, 111-236*).

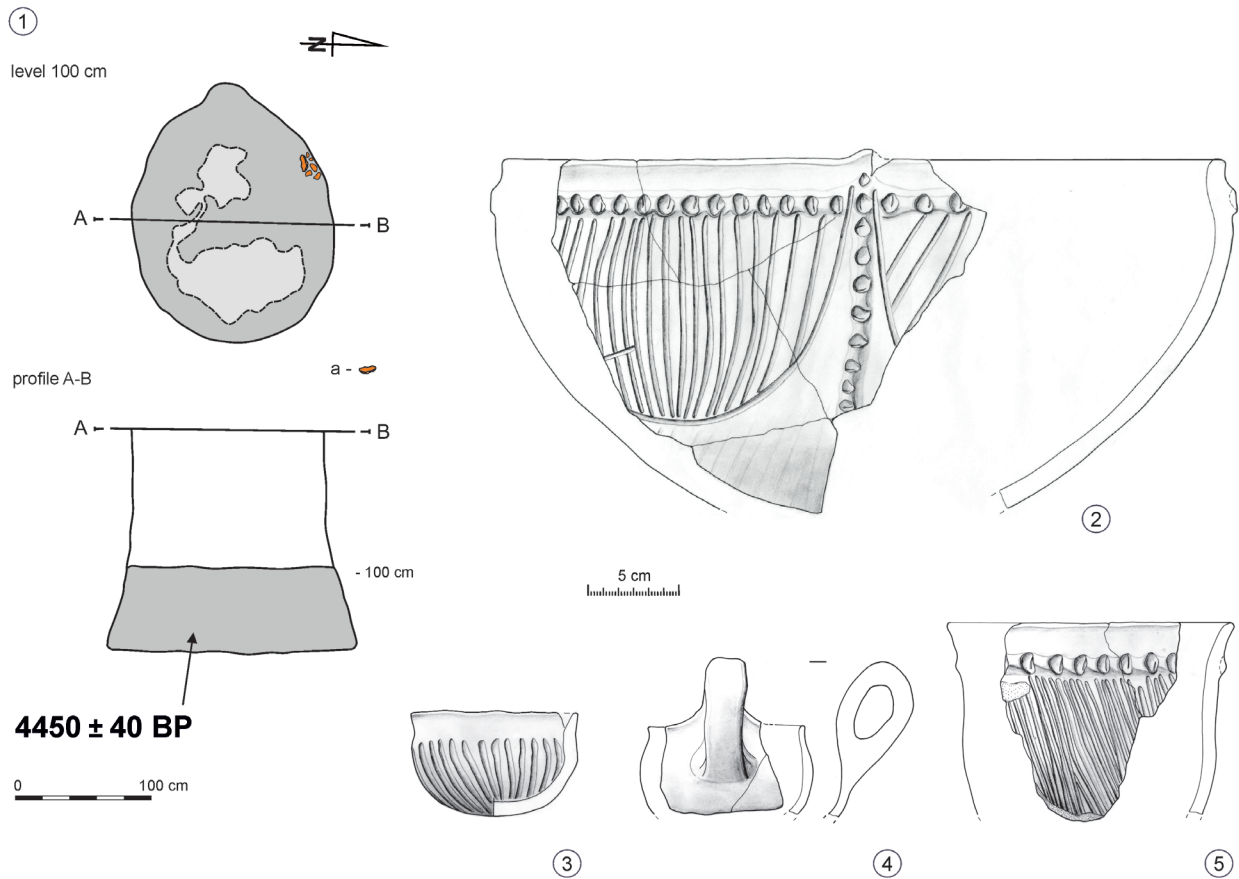


Fig. 3. Kraków-Pleszów, site 17-20. Settlement context for radiocarbon dated materials: 1 – plan and profile views of the feature 155; 2-5 – clay vessels from the feature; 6 – plan of the eastern part of the Baden culture settlement zone with location of the feature 155 (after Godłowska 1976; Rook 1971 and excavation documentation. Illustration: A. Zastawny, A. Brzeska-Zastawna, B. Grabowska.

Smardzowice, site 38

Site no. 38 in Smardzowice is located 15 km north-west of the centre of Kraków and in the southern part of the Jurassic Kraków-Częstochowa Upland (Fig. 1). It is located in an unusual place, on top of a limestone rock called „Puchacza Skała“, raised 80 m above the bottom of the Prądnik river valley (Fig. 4: 2). The site is destroyed by natural erosive processes. The soil with archaeological material flows down a narrow rock crevice that cuts through the „Puchacza Skała“ rock. In connection with this situation, the Archaeological Museum in Kraków carried out rescue excavations in 2009 – 2017 under the supervision of A. Zastawny. The discovered traces indicate the existence of a multiple use camp of the Baden culture, associated with the extraction of flint (Zastawny 2012, 147-159; Zastawny/Nowak 2012, 55-72). Several research trenches were established, among others at the foot and above the rock crevice (Fig. 4: 3). During the research, several features with a soil fill were found. Feature no. 1, which provided organic material for radiocarbon dating, was the best preserved. The pit was discovered in trench II, on a small flat directly at the „entrance“ to the rock crevice (Fig. 4: 4, 5).

A fragment of an animal bone (cattle) discovered in 2014 was selected for radiocarbon analyzes. The result was 4290.30 BP /Poz-70506 / (Table 1; Fig. 2). After calibration, the date marks the range 3010 – 2876 BC (95.4 %) and 2914 – 2888 BC (68.3 %). Feature 1 had an oval shape in plan view (dimensions 100 x 90 cm) and a regular trough-shaped outline in a cross section (Fig. 4: 6). The upper part of the pit was probably destroyed by erosion, as evidenced by the numerous pottery sherds and stone material that flowed from the top of the „Puchacza Skała“ rock - from trench II to trench I (Fig. 4: 3; Zastawny 2012, ryc. 5, 6). In the soil fill of feature 1, several dozen fragments of vessels of the Baden culture were discovered, including a completely preserved flat cup with a tape-shaped handle and an ornament of vertical grooves on the belly (Fig. 4: 1). There were also animal bones, flint products, burnt wood, and numerous fragments of limestone (Fig. 4: 6).

The obtained date is the first radiocarbon measurement for materials from the Smardzowice site. A few years ago it was published (Zastawny/Horváthová 2017, ryc. 3), but without detailed description. All the materials from Smardzowice have not yet been elaborated.

Igołomia, site 1

Site 1 in Igołomia, Kraków district is located 22 km east of the center of Kraków, on the left bank terrace of the Vistula river (Fig. 1). The history of archaeological research began here in 1930. From that time, excavations were carried out intermittently until 1982, mainly by the present Institute of Archaeology and Ethnology of the Polish Academy of Sciences in Kraków (Dobrzańska 1990, 10-12). The site is divided into the western part (Igołomia-Park) and the eastern part (Igołomia-Wschód). Traces of the settlement of the Baden culture are mainly concentrated in the eastern part (Fig. 5: 1). They form a medium-sized settlement site, consisting of approx. 20 pits, a fragment of a ditch and several culturally uncertain graves. The materials of the Baden culture, like that of other Neolithic cultures, have unfortunately not been fully published to this day. We know information about them from short reports from fieldwork (Gajewski 1957, 57-73; 1959a, 41-80; 1959b, 17-31; Nosek 1955, 29-47).

An animal bone (shoulder blade of a large mammal) from feature 29 was selected for measuring the absolute age. The result was 4265.35 BP /Poz-77995/ (Table 1; Fig. 2). After calibration the date marks the range 3006 – 2702 BC (95.4 %) and 2912 – 2877 BC (68.3 %). Feature 29 was discovered in 1953 during excavations conducted by S. Nosek (1955, 29-47). It was located in a small cluster of several other pits of the Baden culture, situated in the central part of the settlement (Fig. 5: 1, 2). The pit 29 had an oval outline in plan view and dimensions of approx. 380 x 250 cm (no data on the shape of the pit in the cross section and its depth). The radiocarbon dated animal bone lay in the lower part of the pit at a depth of 190 – 210 cm. Ceramic material, daub, charcoal and animal bones, including several skeletons of young dogs, were discovered in the pit (Nosek 1955, 31). From the feature in question, only one completely preserved vessel was published – a pot with s-shaped profile and with traces of smeared surface (Fig. 5: 3; Nosek 1955, ryc. 2). The radiocarbon date obtained for the feature 29 is the first measurement of the age of materials from the Baden culture settlement at site 1 in Igołomia.

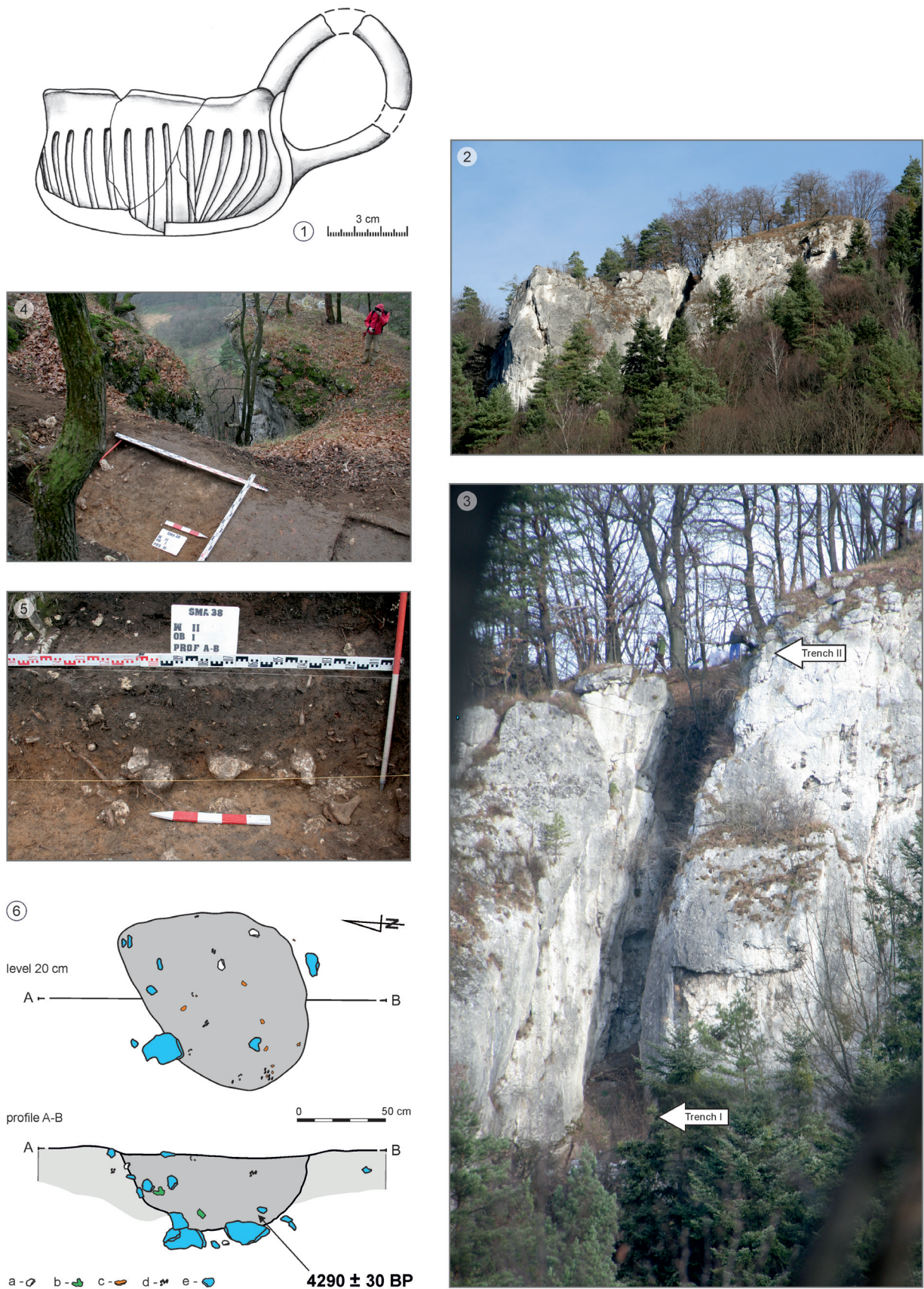


Fig. 4. Smardzowice, site 38, Kraków district. Settlement context for radiocarbon dated materials: 1 – clay cup of the Baden culture from the feature 1; 2 – general view of the site situated on the „Puchacza Skala“ rock; 3 – rock crevice and location of research trenches no. I and II; 4-5 – trench II and feature 1 during exploration; 6 – plan and profile views of the feature 1: a – sherds; b – bones; c – daubs; d – charcoal; e – stones (after Zastawny 2012). Photo and illustration: A. Zastawny.

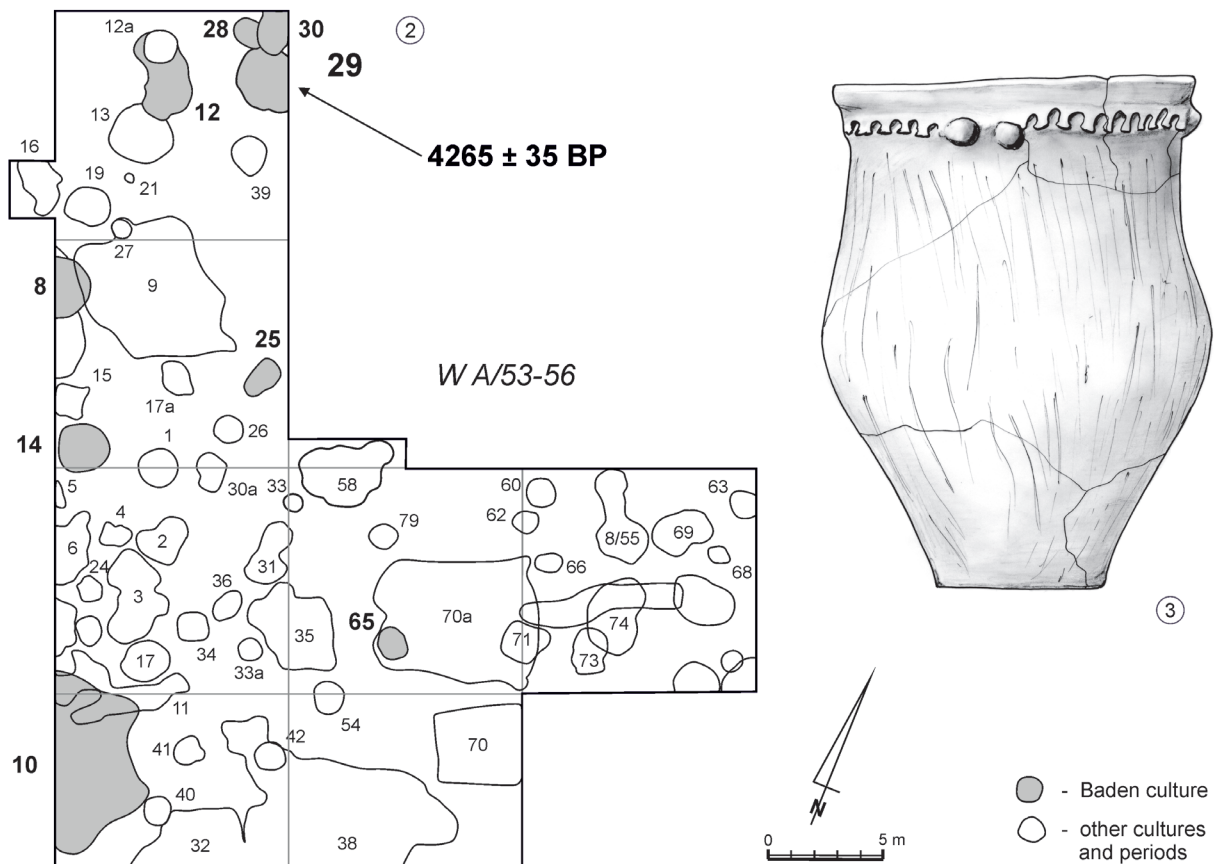
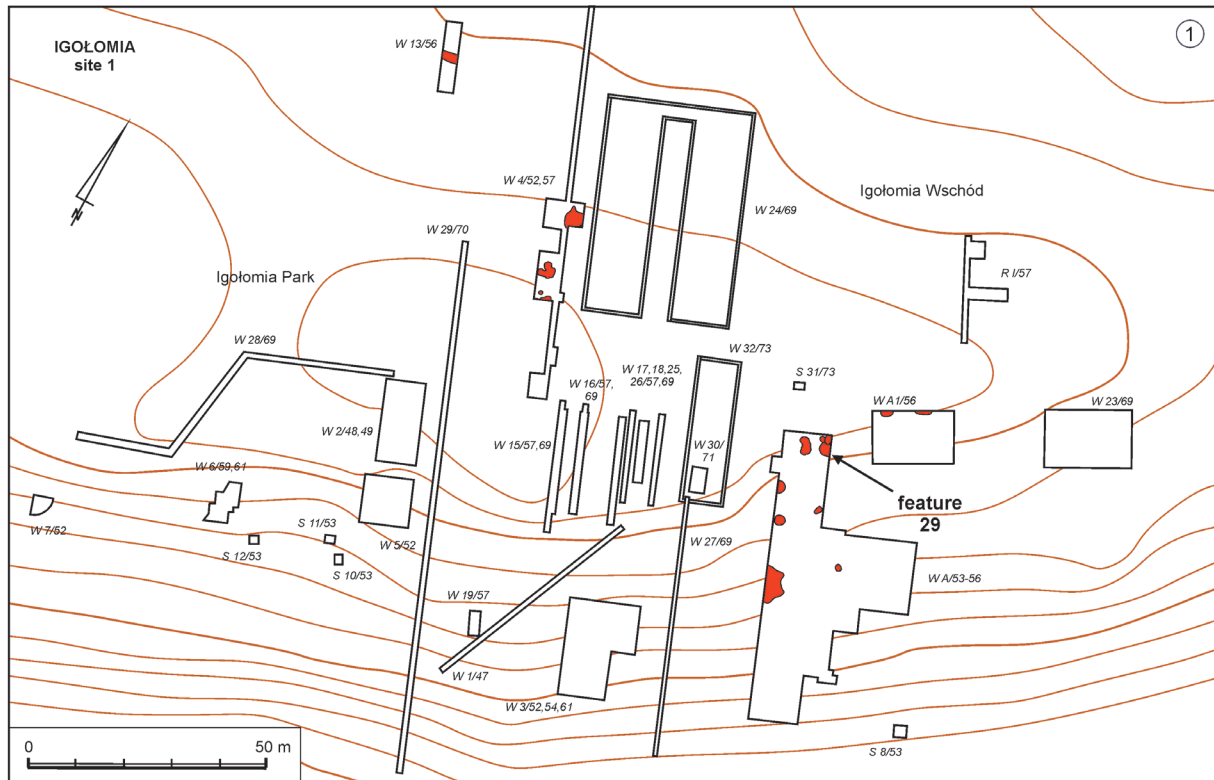


Fig. 5. Igołomia, site 1, Kraków district. Settlement context for radiocarbon dated materials: 1 – traces of the Baden culture settlement on the site, 2 – trench No. W A/53-56 with arrangement of pits and location of the feature 29, 3 – clay pot from the feature 29 /without scale/ (after Dobrzańska 1990; Gajewski 1957; 1959a; 1959b; Nosek 1955). Illustration: A. Zastawny.

Evaluation of the result of radiocarbon dating

The three radiocarbon dates discussed in the article were obtained from samples of animal bones: dog (Kraków-Pleszów), cattle (Smardzowice) and a large mammal of an unspecified species (Igołomia). In each case, the bones were obtained during systematic excavations. They were found in the fills of settlement pits in the lowest layers at the bottoms of the features (Fig. 3: 1; 4: 6). The pits were parts of larger spatial structures (permanent sites, multiple use camp) and were located in the vicinity of other features or finds of the Baden culture (Fig. 3: 6; 5: 1). The sites for which age measurements were obtained are located in different settlement zones of the discussed culture (Fig. 1). When assessing the archaeological context of the dated samples, it can be considered very good. This has a great influence on the representativeness and reliability of the dating results. On the other hand, the publication of materials from the studied features is slightly worse, as is the possibility of correlating the results in the field of relative and absolute chronology. Feature 155 from Kraków-Pleszów, discovered in 1954, has been discussed in detail and published (*Rook 1971*, 141, ryc. 15, Plate XXVII: 10; XXIX: 1-10, 13). For the pit 29 from Igołomia, explored in 1953, we have a short description and drawing of only one vessel (*Nosek 1955*, 31, ryc. 2). Basic information on feature 1 from Smardzowice has been published (*Zastawny 2012*, 152), but it is only illustrated in this article (Fig. 4: 1, 4-6). Inventory from this pit has not yet been elaborated.

The new radiocarbon dates together form the chronological range 4450.40 – 4265.35 BP (Table 1). After calibration we get the time frame: 3338 – 2702 calBC (95.4 %) and 3326 – 2877 calBC (68.3 %). The time range for the date from Kraków-Pleszów is clearly older than the dates from Igołomia and Smardzowice and is practically excluded from them (Fig. 2). The results from Igołomia and Smardzowice, on the other hand, are almost identical, which can be seen especially clearly after the calibration of both dates (Table 1, Fig. 2). The latter also have much more consistent probability distribution plots compared to Pleszów, so they are more reliable.

The plot for the Pleszów date is stretched and inconsistent on the calibration curve (Fig. 2). It indicates a very wide time range: 304 years for all probability ranges of 68.3 % (3326 – 3022 BC) and 406 years for all probability ranges of 95.4 % (3338 – 2932 BC). This dating is difficult to assess. The most probable time interval for the obtained date from Pleszów seems to be the result with the highest probability for 95.4 %, i.e. 3196 – 3008 BC, i.e. a period of 188 years (Table 1). The result calculated in a similar way with the highest probability for 68.3 % gives us the range of 3326 – 3231 BC and 95 years. Interpretation is additionally hindered by the fact that the most reliable time intervals indicated above for both probabilities of 68.3 % and 95.4 % are mutually exclusive.

The evaluation of the dates from Smardzowice and Igołomia looks more favorable (Table 1; Fig. 2). For a probability of 68.3 % we get the range of 26 years for Smardzowice (2914 – 2888 BC) and 35 years for Igołomia (2912 – 2877 BC). For the most probable ranges, for a probability of 95.4 %, we obtain the range of 62 years for Smardzowice (2938 – 2876 BC) and 67 years for Igołomia (2929 – 2860 BC). The time ranges 2938 – 2876 BC for Smardzowice and 2929 – 2860 BC for Igołomia seem to be the most probable.

The date from feature 155 from Kraków-Pleszów is one of the oldest radiocarbon markings of the Baden culture in Lesser Poland. It should be associated with the beginnings of this culture near Kraków, i.e. with the early stage of the late-classical horizon, in which the ornamentation of the vessels still shows features of the early-classical style (*Zastawny 2011*, 441-445, ryc. 2, 12A). In the inventory of pit 155 we find such features. These include, first of all, the „oblique grille“ ornament on a wide-opening vessel (*Rook 1971*, Plate XXVII: 10). Most of the forms of vessels and decorations from this feature generally correspond to the late-classical style (Fig. 3: 2-5). It can be concluded that the early absolute dating of the materials from the pit in question is fully confirmed by the relative chronology, based on the style of vessel decoration.

We are less confident in assessing the cases of Smardzowice and Igołomia in this respect. The dates obtained in these sites correspond, for a change, to the youngest stage of the Baden culture development in Lesser Poland (the final stage of the late-classical horizon), with ceramics with the features of the Bośaća group (*Zastawny 2011*, 445, ryc. 2, 12B). In Smardzowice less characteristic fragments of vessels come from pit 1, however, the chronology of the entire site is related just to the final stage of the late-classical horizon (*Zastawny 2012*, 156). Decorations in the Bośaća style, mainly linear patterns of stamp

prints, were discovered, among others, in trench I (Zastawny 2012, 156, ryc. 5: 6, 6: 3), to which the ceramics flowed down as a result of erosion from trench II (Fig. 4: 3). It is likely that some of these materials were originally located in the upper levels of pit 1 (partially destroyed), located just in trench II (Fig. 4: 4, 5). The late ¹⁴C date for Smardzowice is therefore consistent with the „ceramic“ chronology of the traces of settlement.

The unfinished materials from Igołomia do not make it possible to assess the relative chronology of the settlement of the Baden culture on this site. The forms of vessels, which include the pot from feature 29 (Fig. 5: 3), are not a good chronological indicator and occur throughout the development period of the culture in question in Lesser Poland. In older literature the site in Igołomia was assessed as related to the late development of the Baden culture (Kozłowski 1965, Tab. IV: 24; Sochacki 1970, 350, 351). The obtained radiocarbon date confirms the above qualification.

New ¹⁴C dates against the background of the absolute chronology of the Baden culture in Lesser Poland

In the history of research on the Baden culture in Lesser Poland absolute chronology was the least worked out issue for a long time. The first two radiocarbon dates, useful for research, were published only in 1986 for features from Kraków-Pleszów 17 (Godłowska 1986, 49-58). In 2006, a series of seven dates from Iwanowice 1 and Kraków-Zesławice 21 was presented (Furholt/Machnik 2006, 325-354). In 2010, four more dates were obtained (Valde-Nowak 2010, 184; Włodarczak 2013, 375), only one of which corresponded to the time frame of the Baden culture (Smroków 17, feature 7). Twelve new age measurements for 9 sites were published in 2015 (Dobrzańska et al. 2016, 246; Zastawny 2015a, 191-219; 2015b, 87-123) and one date from the grave in the Ciemna cave in Ojców in 2018 (Valde-Nowak et al. 2018, 305-363). Together with the three dates presented in this article, we currently have 26 ¹⁴C dates for the Baden culture in Lesser Poland. They come from 15 sites and were obtained for 2 human burials and 24 settlement pits (Zastawny 2015b, ryc. 6, 7).

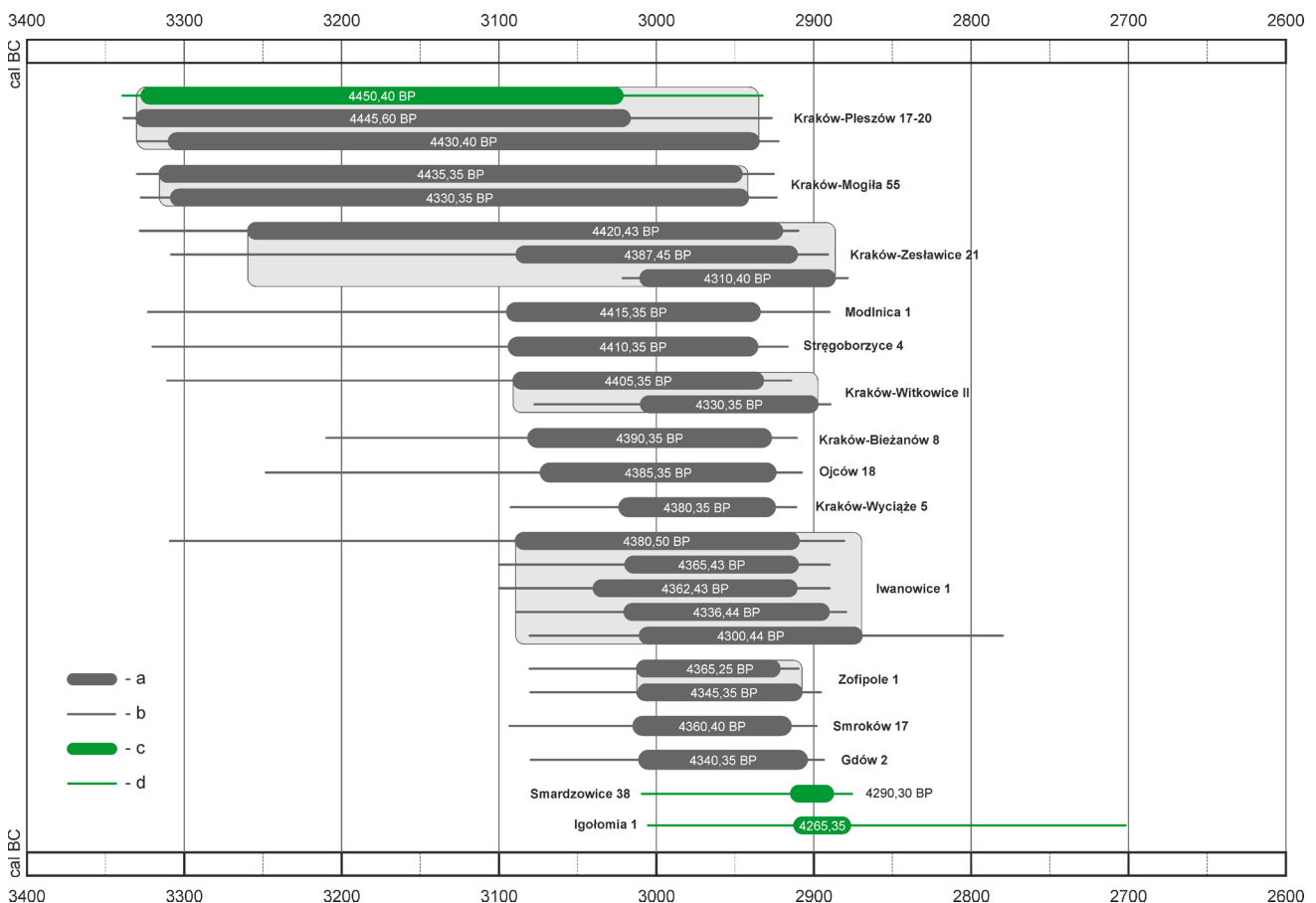


Fig. 6. Absolute chronology sequence of the Baden culture sites with ¹⁴C dates in Lesser Poland: a – probability range 68.3 %; b – probability range 95.4 %; c – probability range 68.3 % for new ¹⁴C dates; d – probability range 95.4% for new ¹⁴C dates.

The sites with radiocarbon dates represent each of the most important settlement zones of the Baden culture in Lesser Poland (Fig. 1). We only have one age measurement of most of these sites. More than one sample of the dating material was tested on 6 settlements. Most dates come from Iwanowice 1 (5 dates), Kraków-Pleszów 17-20 (3 dates), Kraków-Zesławice 21 (3 dates), Kraków-Mogiła 55, Kraków-Witkowice II and Zofipole 1 (2 dates each). The sites with ¹⁴C dates form the chronological sequence of the development of the Baden culture (Fig. 6, 7).

Radiocarbon dating from 15 sites was presented in two graphical variants, taking into account a wider (Fig. 6) and a narrower (Fig. 7) range of data. In a wider variant the results of calibration of all intervals for a probability of 68.3 % and 95.4 % were presented (Fig. 6). In the second variant only the most probable probability intervals of 95.4 % were taken into account (Fig. 7). In both variants the new ¹⁴C dates open (Kraków-Pleszów 17-20) and close (Smardzowice 38, Igołomia 1) the time frames of the Baden culture in Lesser Poland (Fig. 6, 7). The date from Kraków-Pleszów (4450.40 BP) is currently

the oldest age marking for an feature of Baden culture in the region in question. Together with two other dates from this site, it shows us that the oldest traces of settlement come from Kraków-Pleszów 17-20.

The oldest settlements include also the sites in Kraków-Mogiła 55 and partially in Kraków-Zesławice 21. The earliest and the most extended chronological position in Pleszów, Mogiła and Zesławice is best visible when all probability ranges 68.3 % and 95.4 % are taken into account (Fig. 6). The lifetime of these sites covers a very wide period of 3340 – 2915 BC, which seems unlikely. We will obtain a more realistic range of dates if we take into account only the intervals with the highest probability for 95.4 % (Fig. 7). For these three sites it will then be 3199 – 2915 BC. The new ¹⁴C date from Pleszów will close within 3169 – 3008 BC (Table 1).

The absolute chronology of the rest of the sites of the Baden culture in Lesser Poland covers the period around 3100 – 2900 BC, with some slight deviations towards older or younger age (Fig. 6, 7). The new dates from Smardzowice and Igołomia (4290.30 BP, 4265.35 BP) stand out in this group as the most time-compact and one of the youngest (Fig. 6). Considering only the ranges with the highest probability for 95.4 %, the time frames for both dates are 2938 – 2860 BC (Table 1). The lower boundary of the range for the date from Igołomia (2860 BC) currently marks the end of the development of the Baden culture settlement in Lesser Poland (Fig. 7).

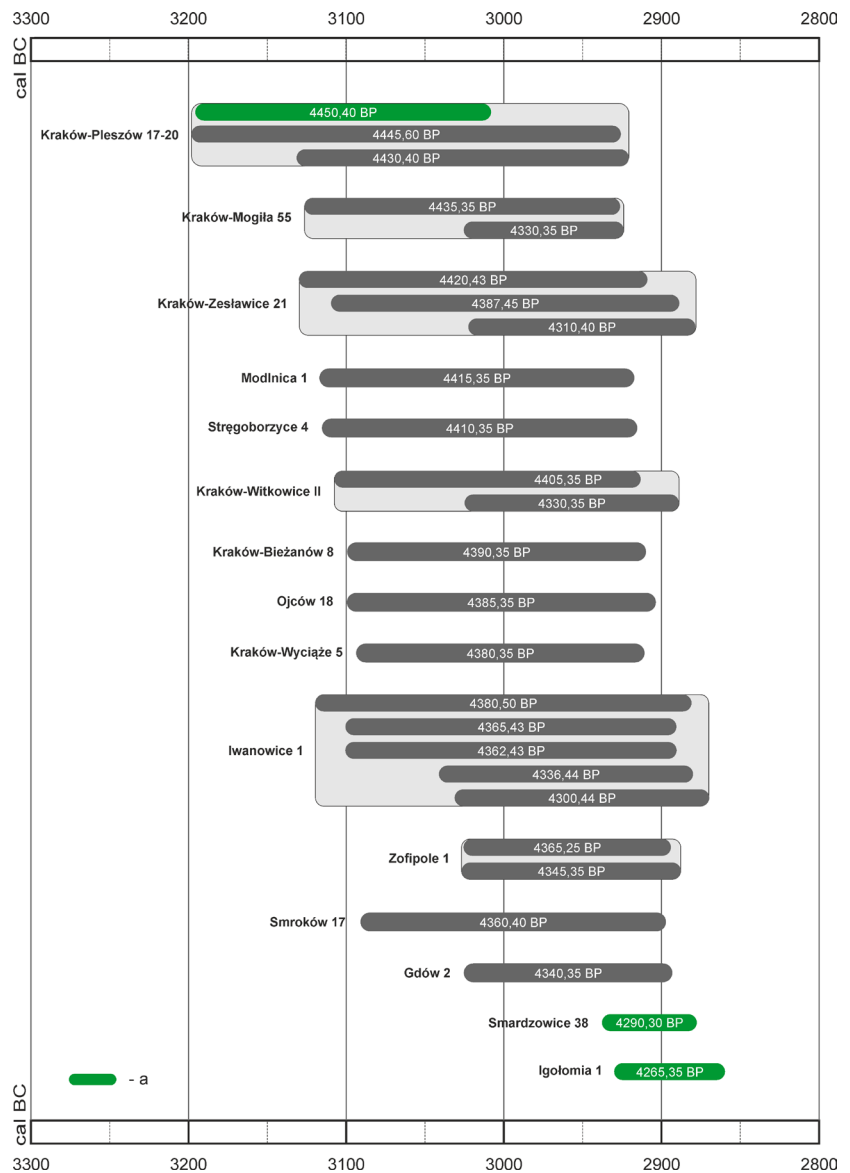


Fig. 7. Absolute chronology sequence of the Baden culture sites with ¹⁴C dates in Lesser Poland taking into account the most probable ranges for a probability of 94.5 %: a – new ¹⁴C dates.

BIBLIOGRAPHY

- Bielenin 1959* – K. Bielenin: Zabytki kultury ceramiki promienistej z Pleszowa (Nowa Huta) z badań w roku 1953. *Materiały Archeologiczne* 1, 1959, 63-76.
- Dobrzańska 1990* – H. Dobrzańska: Osada z późnego okresu rzymskiego w Igołomi, woj. krakowskie, Część I. *Materiały*, Wrocław-Warszawa-Kraków-Gdańsk-Łódź 1990.
- Dobrzańska et al. 2016* – H. Dobrzańska/J. Wilczyński/A. Zastawny: The settlement of the Baden culture at site 1 in Zofipole, Kraków district (results of excavations conducted in 1986). *Sprawozdania Archeologiczne* 68, 2016, 223-262.
- Furholt/Machnik 2006* – M. Furholt/J. Machnik: Iwanowice Babia Góra I and the settlements with Baden ceramics in Little Poland. Questions concerning their duration. *Sprawozdania Archeologiczne* 58, 325-354.
- Gajewski 1957* – L. Gajewski: Sprawozdanie z badań terenowych w rejonie Igołomia-Wschód w 1955 r. *Sprawozdania Archeologiczne* 3, 1957, 57-73.
- Gajewski 1959a* – L. Gajewski: Sprawozdanie z badań terenowych w Igołomi za rok 1956 r. *Sprawozdania Archeologiczne* 5, 1959, 41-48.
- Gajewski 1959b* – L. Gajewski: Sprawozdanie z prac badawczych, prowadzonych w 1957 r. w Igołomi, pow. Proszowice, i okolicy. *Sprawozdania Archeologiczne* 8, 1959, 17-31.
- Godłowska 1976* – M. Godłowska: Próba rekonstrukcji rozwoju osadnictwa neolitycznego w rejonie Nowej Huty. *Materiały Archeologiczne Nowej Huty* 5, 1976, 7-180.
- Godłowska 1986* – M. Godłowska: Nowe daty 14C dla kultury ceramiki promienistej z Krakowa Nowej Huty na stanowisku 17 (Pleszów). *Materiały Archeologiczne Nowej Huty* 10, 1986, 49-58.
- Godłowska/Kaczanowska 1975* – M. Godłowska/M. Kaczanowska: Nowa Huta – Pleszów. Stanowisko 17. *Informator Archeologiczny: badania rok 1975*, 1975, 42.
- Horváthová/Zastawny 2016* – E. Horváthová/A. Zastawny: Rádiouhlíkové datovanie ďalších lokalít badenskej kultúry z územia Slovenska. In: *Otázky neolitu a eneolitu Čiech, Moravy a Slovenska 2015*. *Archeologie střední Čechy* 20, Supplementum, 2016, 959-966.
- Kozłowski 1965* – J. K. Kozłowski: Ze studiów nad kulturą ceramiki promienistej. *Archeologia Polski* 10, z. 1, 1967, 178-216.
- Nosek 1955* – S. Nosek: Wyniki badań terenowych e rejonie Igołomia-Wschód prowadzonych w latach 1953 i 1954. *Sprawozdania Archeologiczne* 1, 1955, 29-47.
- Rook 1971* – E. Rook: Materiały kultury ceramiki promienistej odkryte na stanowisku Nowa Huta-Pleszów (badania w latach 1954-1963). *Materiały Archeologiczne Nowej Huty* 13, 1971, 111-236.
- Sochacki 1970* – Z. Sochacki: Z badań nad kulturą ceramiki promienistej w Europie. *Archeologia Polski* 15, z. 2, 1970, 305-363.
- Valde-Nowak 2010* – P. Valde-Nowak: Pucharowy, badeński i mierzanowicki epizod w beskidzkim przełomie Skawy. In: S. Czopek/S. Kadrow (eds.): *Mysła i łopata. Studia archeologiczne dedykowane wybitnemu uczonemu Janowi Machnikowi w osiemdziesiątą rocznicę urodzin przez przyjaciół, kolegów i uczniów*. Rzeszów 2010, 181-189.
- Valde-Nowak et al. 2018* – P. Valde-Nowak/D. Stefański/A. Szczepanek: A Neolithic Child Burial from Ciemna Cave in Ojców National Park, Poland. In: D. H. Werra/M. Woźny (eds.): *Between History and Archaeology. Papers in honour of Jacek Lech*. Archaeopress, Oxford 2018, 279-288.
- Włodarczak 2013* – P. Włodarczak: Projekt badań chronologii absolutnej eneolitu i początków epoki brązu w Małopolsce. In: I. Cheben/M. Soják (eds.): *Otázky neolitu a eneolitu našich krajín – 2010*. Nitra 2013, 373-387.
- Zastawny 2011* – A. Zastawny: Chronologia i formy oddziaływań kompleksu badeńskiego w Małopolsce. *Praehistorica* 19, 2011, 143-450.
- Zastawny 2012* – A. Zastawny: Nowe stanowisko kultury badeńskiej z Jury Krakowsko-Częstochowskiej: Smardzowice st. 38, pow. Kraków, Małopolska. In: J. Peška/F. Trampota (eds.): *Otázky neolitu a eneolitu 2011*. Mikulov – Olomouc 2012, 147-159.
- Zastawny 2015a* – A. Zastawny: Absolute chronology of the Baden culture in Lesser Poland. In: M. Nowak/A. Zastawny (eds.): *Via Archaeologica*. Kraków 2015, 191-219.
- Zastawny 2015b* – A. Zastawny: Nowe wyniki pomiaru wieku dla materiałów kultury badeńskiej w późnym neolicie Małopolski. *Przegląd Archeologiczny* 63, 2015, 87-123.
- Zastawny/Horváthová 2017* – A. Zastawny/E. Horváthová: Kultura badeńska pomiędzy dorzeczem górnej Wisły i północnym Pocisiem. Polsko-słowacki projekt badań transkarpackich relacji kulturowych. In: J. Gancarski (ed.): *Stan i potrzeby badań archeologicznych w Karpatach*. Krosno 2017, 245-268.
- Zastawny/Nowak 2012* – A. Zastawny/M. Nowak: Badania wykopaliskowe w rejonie Puchaczej Skały w dolinie Prądnika (Smardzowice st. 38). *Prądnik. Prace i Materiały Muzeum im. Władysława Szafera* 22, 2012, 55-72.

RESUMÉ

Nové dáta z výskumu absolútnej chronológie badenskej kultúry v Malopoľsku

Článok prezentuje výsledky rádiokarbónového datovania spolu s interpretáciami a popisom nálezu kontextu pre vzorky zo zvieracích kostí z troch lokalít badenskej kultúry v Malopoľsku: Kraków-Pleszów 17-20, Smardzowice 38 a Igołomia 1 (tabela 1, obr. 2). Nové rádiokarbónové dáta dopĺňajú malú sériu 23 AMS dát, ktoré sme doteraz mali. Súčasná databáza absolútnej chronológie má 26 AMS dát pochádzajúcich z 15 lokalít (obr. 1). Z najväčšieho sídliska predmetnej kultúry v Malopoľsku, skúmaného v rokoch 1952 – 1981, pochádza obj. 155 z Krakowa-Pleszowa, z ktorého bola kosť psa datovaná na 4450,40 BP (obr. 3). Druhé dátum – 4290,30 BP bolo získané zo vzorky kostí dobytky z výskumu v roku 2014 z obj. 1 na lokalite v Smardzowicach, kde sa našli zvyšky sezónneho sídliska (obr. 4). Tretie dátum pochádza zo stredne veľkého sídliska v Igołomi, z ktorého dodnes nie sú celkom publikované výsledky výskumu z 50. rokov 20. storočia (obr. 5). AMS údaj 4265,35 BP bol získaný z kosti bližšie neidentifikovaného cicavca nájdeného v obj. 29.

Výsledky výskumu sú zaujímavé a dôležité. Pre badenskú kultúru v Malopoľsku je v súčasnosti najstaršie AMS dátum z Krakowa-Pleszowa (4450,40 BP), zatiaľ čo menované dáta zo Smardzowice a Igołomi sú najmladšie (4290,30 BP, 4265,35 BP). Získané výsledky stanovili časový rámec vývoja badenskej kultúry v oblastiach severne od Karpát (obr. 6; 7). Po kalibrácii a zohľadnení intervalov s najvyššou pravdepodobnosťou pre 95,4 % získame časové rozpätie 3169 – 2860 BC pre nové AMS dáta. Rámec vývoja predmetnej kultúry na základe porovnania všetkých 26 AMS dát pochádza z 15 lokalít v rozmedzí rokov 3199 – 2860 BC. Väčšia časť výsledkov merania veku je však poznačená užším intervalom, ktorý zodpovedá cca 3100 – 2900 BC (obr. 6; 7). Práve s týmto obdobím by sa mala spájať podstatná časť vývoja badenskej kultúry v Malopoľsku.

Rádiokarbónové analýzy diskutované v článku boli vykonané v Poznań Radiocarbon Laboratory ako súčasť poľsko-slovenského výskumného projektu v Narodowym Centrum Nauki Polska (NCN-2013/09/B/HS3/03401).

Obrazová príloha

Obr. 1. Lokalizácia lokalít badenskej kultúry v Malopoľsku: a – lokality; b – sídliská s ¹⁴C AMS údajmi; c – sídliská s novými ¹⁴C AMS údajmi. Autor: A. Zastawny. 1 – Kraków-Pleszów 17-20; 2 – Smardzowice 38; 3 – Igołomia 1; 4 – Smroków 17; 5 – Iwanowice 1; 6 – Ojców 18; 7 – Modlnica 1; 8 – Kraków-Witkowice II; 9 – Kraków-Zesławice 21; 10 – Kraków-Mogiła 55; 11 – Kraków-Wyciąże 5; 12 – Zofipole 1; 13 – Stręgoborzyce 4; 14 – Kraków-Bieżanów 8; 15 – Gdów 2.

Obr. 2. Nové rádiouhlíkové dáta badenskej kultúry premietnuté na kalibračnú krivku IntCal20.

Obr. 3. Kraków-Pleszów 17-20. Sídliskový kontext pre rádiouhlíkovo datované materiály: 1 – pôdorysné a profilové pohľady na obj. 155; 2-5 – hlinené nádoby z objektu; 6 – pôdorys východnej časti sídliskovej zóny badenskej kultúry s umiestnením obj. 155 (podľa *Godłowska 1976; Rook 1971* a terénna dokumentácia). Autor: A. Zastawny, B. Grabowska.

Obr. 4. Smardzowice 38, okr. Kraków. Sídliskový kontext pre rádiouhlíkovo datované materiály: 1 – hlinená šálka badenskej kultúry z obj. 1; 2 – celkový pohľad na lokalitu situovanú na skale „Puchacza Skała“; 3 – skalná štrbina a umiestnenie výskumných plach č. I a II; 4-5 – plocha II a obj. 1 počas prieskumu; 6 – pôdorysné a profilové pohľady na obj. 1: a – črepy; b – kosti; c – mazanice; d – uhliky; e – kamene (podľa *Zastawny 2012*). Autor: A. Zastawny.

Obr. 5. Igołomia 1, okr. Kraków. Sídliskový kontext pre rádiouhlíkovo datované materiály: 1 – stopy osídlenia badenskej kultúry na lokalite; 2 – plocha č. W A/53-56 s usporiadaním jám a umiestnením obj. 29; 3 – hlinený hrniec z obj. 29 /bez mierky/ (podľa *Dobrzańska 1990; Gajewski 1957; 1959a; 1959b; Nosek 1955*). Autor: A. Zastawny.

Obr. 6. Absolútna chronologická sekvencia lokalít badenskej kultúry s ¹⁴C AMS údajmi v Malopoľsku: a – rozsah pravdepodobnosti 68,3 %; b – rozsah pravdepodobnosti 95,4 %; c – rozsah pravdepodobnosti 68,3 % pre nové ¹⁴C AMS dáta; d – rozsah pravdepodobnosti 95,4 % pre nové ¹⁴C AMS údaje.

Obr. 7. Absolútna chronologická sekvencia lokalít badenskej kultúry s ¹⁴C AMS dáta v Malopoľsku s prihliadnutím na najpravdepodobnejšie rozsahy s pravdepodobnosťou 94,5 %: a – nové ¹⁴C AMS dáta.

Tabela 1. Nové výsledky merania veku pre materiály badenskej kultúry v Malopoľsku.

Preklad A. Zastawny, J. Mellnerová Šuteková