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## FLINT SICKLES FROM GRAVES OF THE STRZYŻÓW CULTURE IN THE LIGHT OF USE-WEAR ANALYSIS

### ABSTRACT

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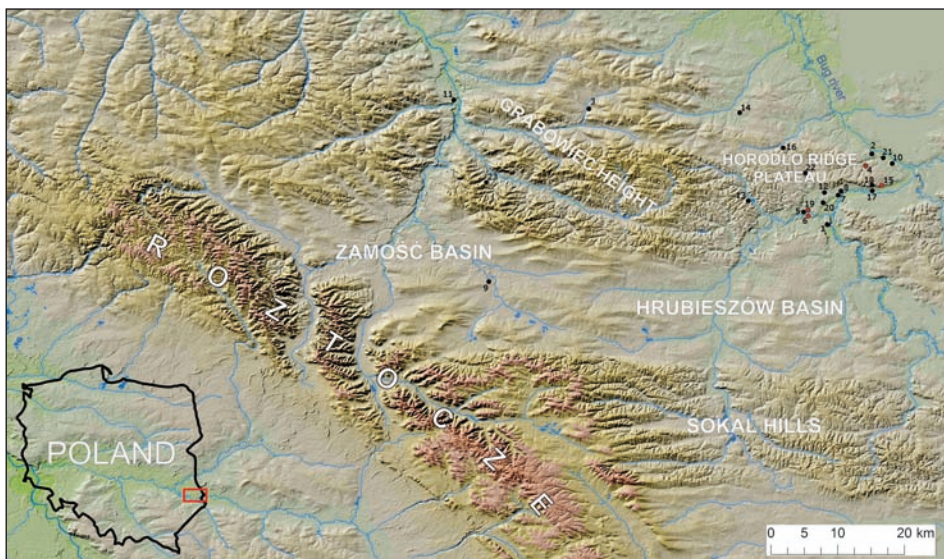
The presented article aims to interpret the function of selected flint sickles from the Early Bronze Age. For this purpose, we made a use-wear analysis of 13 sickles coming from the cemeteries of the Strzyżów culture in south-east Poland: Rogalin, site 15, Hrubieszów-Podgórze, site 1, Hrebennie, sites 10 and 31, and Świerszczów, site 5 (Hrubieszów district, Lublin province). All analyzed sickles were made of Volhynian flint and represent the sub-triangular type. As a result, we can conclude that analyzed tools were used mostly for harvesting cereals or other siliceous plants. They were placed in hafts made of hard organic materials, combined with hide/plant. Conducted studies also revealed that these objects, suitably altered (sickle tips were destroyed right before being deposited in a grave) became important grave goods.

Keywords: flint sickles, use-wear analysis, cemeteries, Strzyżów culture, Early Bronze Age, south-east Poland  
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**Fig. 1.** The most important sites of the Strzyżów culture in Poland. Red colour marks sites that yielded the analysed sickles (on the background map of the lie of the land of the Lublin province as produced by L. Gawrysiak): 1 – Gródek, sites 1C, 6; 2 – Horodło, site 12; 3 – Horodysko, sites 1, 13; 4 – Hrebenne, sites 10, 24, 31, 34; 5 – Hrubieszów, site 16; 6 – Hrubieszów-Podgórze, sites 1, 1B, 5; 7 – Husynne, site 2; 8 – Husynne Kolonia, sites 5, 6; 9 – Hyża, site 1; 10 – Janki Dolne, site 11; 11 – Krasnystaw, site 1; 12 – Moroczyn, site 46; 13 – Nieledeń, site 1; 14 – Raciborowice Kolonia, sites 1, 2; 15 – Rogalin, site 15; 16 – Stefankowice, site 23; 17 – Strzyżów, site 1; 18 – Strzyżów, sites 27, 28; 19 – Świerszczów, site 28; 20 – Teptiuków, site 19; 21 – Wieniawka, site 6; 22 – Wołajowice, site 1; 23 – Stryjów, site 30

Bifacial tools, particularly their morphological analysis, as well as typological, chronological and cultural division have not been the subject of interest or thorough analysis of many researchers exploring flint manufacturing. One of the most noteworthy works on these implements – which are unique in terms of craftsmanship and precision of manufacturing – is a publication by J. Libera (2001 – further literature there). On the basis of available sources, and taking into account several hundred artefacts recorded in Poland and the west of Ukraine, the author established criteria for the classification of various bifacial forms – above all, projectile points, arrowheads and sickles, thus creating a valuable comparative database and a point of reference for further exploration of this research problem. The analysed specimens included sub-triangular sickles characteristic of the Early Bronze Age, Mierzanowice and Strzyżów cultures, which were frequently used as grave goods. During the last two decades, due to, among other things, excavations conducted in the Hrubieszów region, the source base has grown significantly. On top of that, the use-wear analysis has enabled a more thorough examination of these flint tools, not only in terms of their form but also function.

The flint sickles that are the subject of this paper were recorded during excavations carried out at the following cemeteries of the Strzyżów culture in the south-east Poland: Rogalin, site 15, Hrubieszów-Podgórze, site 1, Hrebenne, sites 10 and 31, and Świerszczów, site 5 (Hrubieszów district, Lublin province – Fig. 1). Thirteen flint sickles were subjected to analysis. Graves singled out for the study include both those in which a sickle was the only, or one of the few objects deposited with the deceased, and richly-furnished burials, in which a sickle was deposited along with approx. a dozen copper, bone or shell ornaments, as well as a necklace made of several dozen faience beads, pottery or other flint articles.

## METHOD

In order to determine the function of the selected sickles used by the prehistoric communities, comprehensive use-wear analysis was conducted. This was performed with the use of a Nikon LV150 metallographic microscope and a Keyence VH-Z100R digital microscope, with magnification from 20x to 300x. Interpretation of microscopic polishes, linear traces, and chipping correlated with the results of experimental studies made by one of the authors in the previous years, and the data available in the literature (among others, Keeley 1980; Moss 1983; Vaughan 1985; Anderson-Gerfaud 1988; Juel Jensen 1994; Van Gijn 1990; 2010; Korobkova 1999; Małecka-Kukawka 2001; Rots 2010; Osipowicz 2010; Pyżewicz 2013), has made it possible to determine not only the activities for which flint tools were used, but also the presence of hafting.

## MATERIALS

**Rogalin, site 15** – the site was discovered in 2008 following reports about ploughed out graves. It is situated on an exposed area in the edge zone of the Bug valley, on a slope descending to the south. Excavations conducted in 2009-2018 yielded 19 burials of the Strzyżów culture (Hyrchała 2015; 2021).

1. Sickle made of Volhynian flint, distal end snapped off (Fig. 2). Dimensions: length 14.5 cm, width 5.1 cm, thickness 1.4 cm. The object was found on the surface of the site, and probably comes from a destroyed grave.

2. Sickle made of Volhynian flint, distal end snapped off (Fig. 3). Dimensions: length 13.6 cm, width 4.9 cm, thickness 1.7 cm. Grave 1. The burial pit, 270 × 160 cm, in shape resembling a rectangle with rounded corners, was situated along the W-E axis. The skeleton of a man who died aged between 40 and 45 was deposited at the bottom of the pit, laid extended and supine, with the head to the east. The sickle was within the chest, by the left arm. Grave goods: three clay vessels (cup, vase and amphora), two temple rings made of copper wire, 36 faience beads. <sup>14</sup>C dating: 3440±35 BP (All <sup>14</sup>C dates mentioned in the

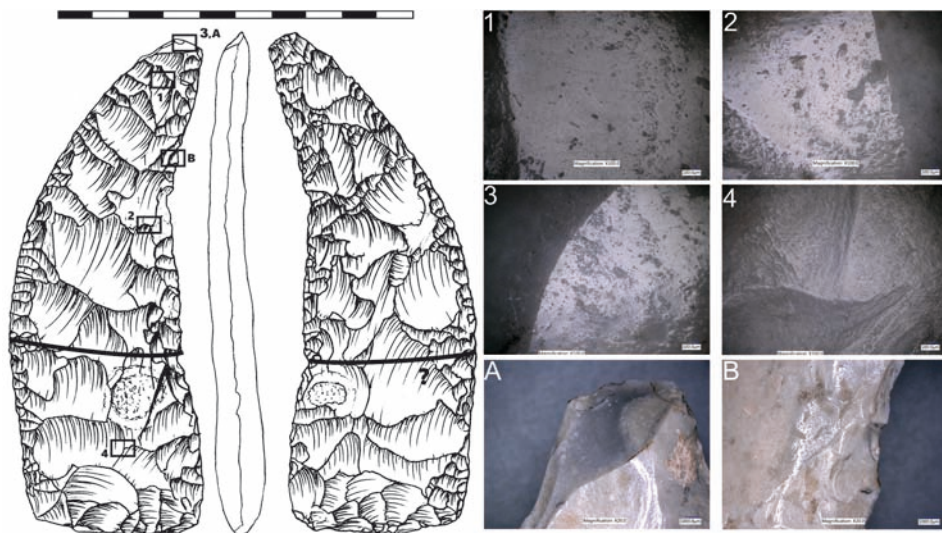


Fig. 2. Rogalin, site 15, destroyed grave (the surface of the site).

1-3 – traces related to cereal harvesting, 4 – hafting traces, A – scar resulting from snapping off of the distal tip, where no use traces were recorded, B – character of the working edge; chip scars with no use traces

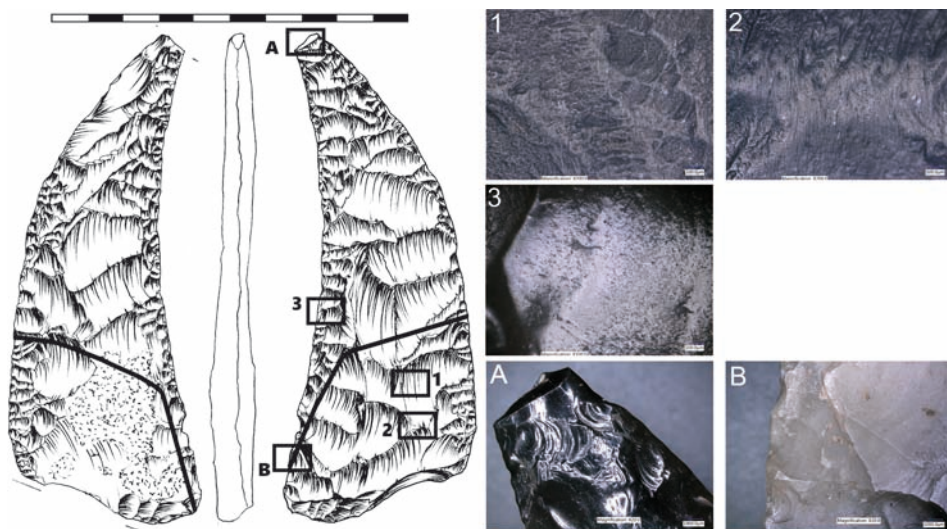


Fig. 3. Rogalin, site 15, grave 1.

1-2 – hafting traces, 3 – traces related to cereal harvesting, A – character of the working edge, distal end snapped off, B – boundary between the hafted part and the one protruding from the haft; single chip scars with no use traces



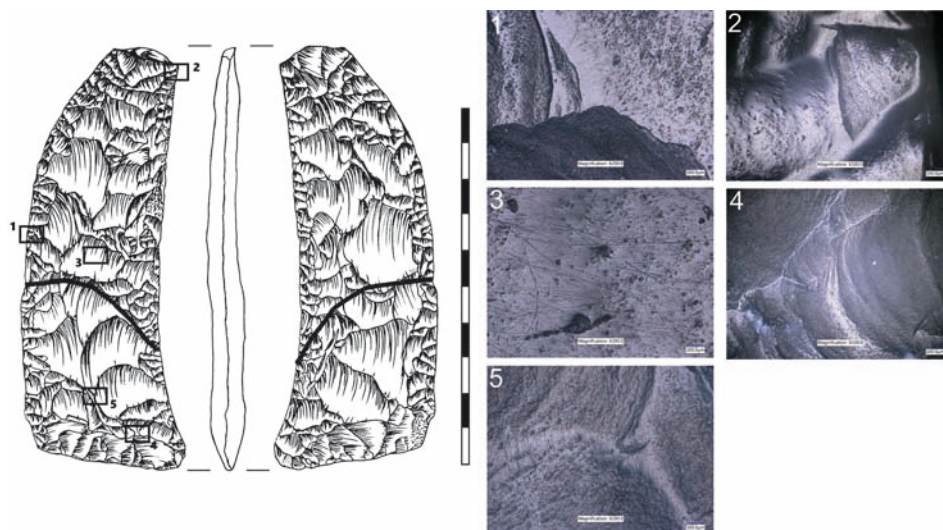


Fig. 4. Rogalin, site 15, grave 4.  
1-3 – traces related to cereal harvesting, 4-5 – hafting traces

publication were established by the Poznan Radiocarbon Laboratory). Literature: Hyrchała 2015, 54, 55; Lorkiewicz-Muszyńska *et al.* 2015, 131.

3. Sickle made of Volhynian flint, distal end snapped off (Fig. 4). Dimensions: length 12.3 cm, width 4.3 cm, thickness 1 cm. Grave 4. The burial pit, 280 × 115 cm, in shape resembling an elongated oval was oriented along the W-E axis. The skeleton of a woman who died aged between 35 and 40 was lying extended and supine, with the head to the west. Additionally, on the east of the burial pit, a left ulna of a small girl was found. The sickle was laid next to pottery, in the west part of the burial pit. Grave goods: three clay vessels (two amphorae and a pot), two temporal rings made of copper, 16 faience beads, two bone beads.  $^{14}\text{C}$  dating: 3495±30 BP. Literature: Hyrchała 2015, 57-59, Lorkiewicz-Muszyńska *et al.* 2015, 131.

4. Sickle made of Volhynian flint, distal end snapped off (Fig. 5). Dimensions: length 12.5 cm, width 4.3 cm, thickness 1.1 cm. Grave 6. The burial pit, 260 × 120 cm, in shape resembling a rectangle with rounded corners, was situated along the W-E axis. At the bottom of the pit was the skeleton of a woman who had died aged between 18 and 20, fragmentarily preserved and burnt, with the head to the east. The sickle was on the left of the skeleton, at the waist. Additionally, on the east of the burial pit, small fragments of the skeleton of a girl who died aged between seven and nine were discovered. Grave goods: fragments of a clay vessel; copper articles: two temporal rings made of sheet and wire, two temporal rings made of wire, nine rings made of wire, sheet fitting of a headband, frag-

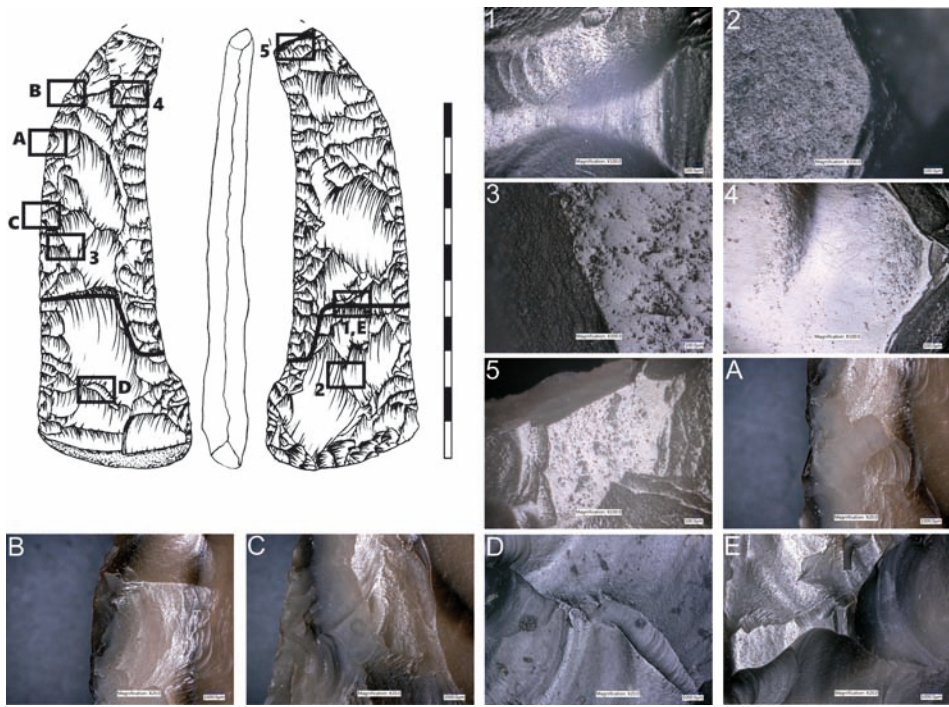


Fig. 5. Rogalin, site 15, grave 6.

1-2, D – hafting traces; 3-5 – traces related to cereal harvesting; A-C – chip scars with no use traces; E – boundary between the hafted part and the one protruding from the haft with visible use traces

ment of a bracelet; 90 faience beads; five shell pendants; a stone grinding plate.  $^{14}\text{C}$  dating:  $3535 \pm 35$  BP. Literature: Hyrchała 2015, 60-64; Lorkiewicz-Muszyńska *et al.* 2015, 131.

5. Sickle made of Volhynian flint, distal end snapped off. No traces of use. Dimensions: length 13.4 cm, width 5 cm, thickness 1.1 cm. Grave 8. The burial pit,  $270 \times 130$  cm, shaped like a rectangle with rounded corners, was situated along the W-E axis and was destroyed as a result of ploughing. Of the whole skeleton, only fragments of a skull of a woman who died aged between 25 and 30 were preserved in the west part of the pit. The sickle was recorded in the north of the pit. Grave goods: near-bottom parts of three clay vessels.  $^{14}\text{C}$  dating:  $3535 \pm 40$  BP. Literature: Hyrchała 2015, 64, 65; Lorkiewicz-Muszyńska *et al.* 2015, 131.

6. Sickle made of Volhynian flint, distal end snapped off. Dimensions: length 11.9 cm, width 5.1 cm, thickness 1.1 cm. Grave 10. The burial pit,  $220 \times 95$  cm, in shape resembling a rectangle with rounded corners was situated along the NS-SE axis. At the bottom of the pit was the skeleton of a man who died aged approx. 47, lying extended and supine, with the head to the north-west. Additionally, on the east of the burial pit a left ulna and the first right rib of a small girl was discovered. The sickle was recorded by the left arm. Grave

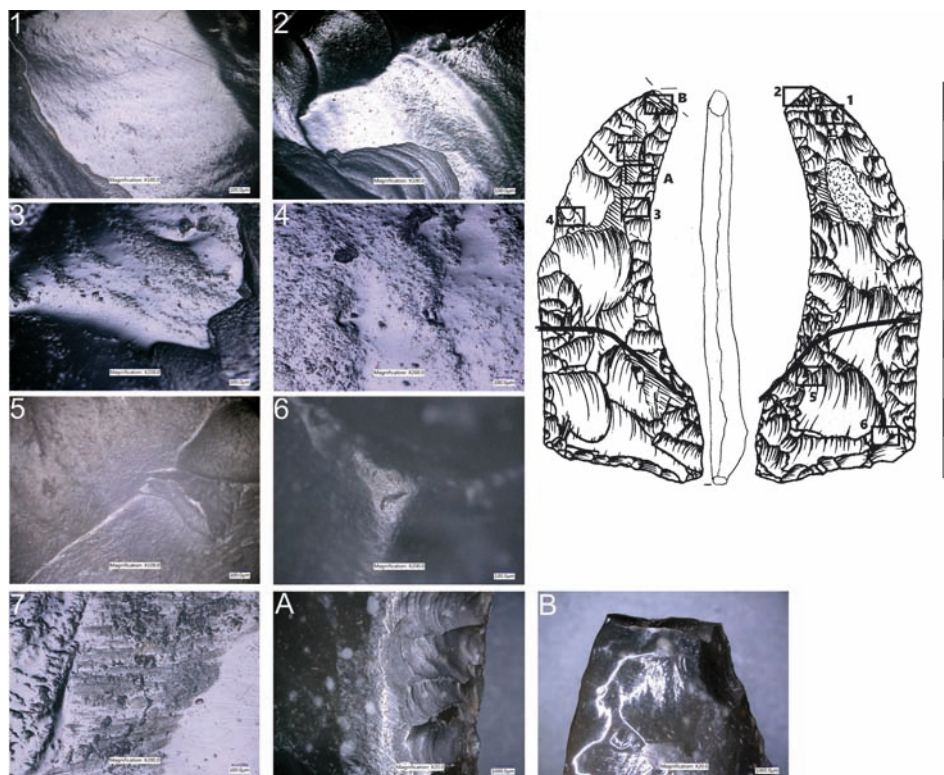


Fig. 6. Rogalin, site 15, grave 12.

1-4 – traces related to cereal harvesting, 5-6 – hafting traces, 7 – traces resulting from polishing the flint surface and harvesting cereals, A – character of the working edge; chip scars with no use traces, B – character of the working part; scar resulting from snapping off of the distal end, no use traces visible

goods: flint articles: a projectile point, 16 arrowheads, a blade-like flake; two faience beads; a bone pin; a bone disc with a large, central perforation and two side ones.  $^{14}\text{C}$  dating:  $3405 \pm 35$  BP. Literature: Hyrchała 2015, 66-69; Lorkiewicz-Muszyńska *et al.* 2015, 131.

7. Sickle made of Volhynian flint, distal end snapped off, polishing traces discernible on one of the surfaces (Fig. 6). Dimensions: length 9.7 cm, width 4 cm, thickness 0.9 cm. Grave 12. The burial pit,  $230 \times 120$  cm, in shape resembling a rectangle with rounded corners, was situated along the NE-SW axis. The skeleton of a man who died aged between 40 and 45 was lying extended and supine, with the lower limbs slightly bent. The sickle was found above the right femur. Grave goods: near-bottom part of a clay vessel. Dating: Early Bronze Age. Literature: Hyrchała 2015, 70, 71, Lorkiewicz-Muszyńska *et al.* 2015, 131.

**Hrubieszów-Podgórze, site 1** – the site is located on a loess headland covered with a layer of chernozem, extending from the south in the Huczwa basin. It was discovered by

A. Kokowski in the course of surface surveys in 1980. The rescue excavations conducted there in 1983-1986 and 2001 yielded features from the Neolithic (the Linear Pottery culture, the Lublin-Volhynian culture), the Bronze Age (the Lusatian culture), the Roman period and the Middle Ages. Thirteen graves of the Strzyżów culture were subjected to investigation.

8. Sickle made of Volhynian flint, distal end snapped off, polishing traces discernible on both surfaces. Dimensions: length 11.6 cm, width 5.1 cm, thickness 1.3 cm. Grave 2. The funerary pit was situated along the N-S axis contained a skeleton, probably of a man who died aged approx. 40, lying extended and supine, with the head to the south. Grave goods: two clay vessels (pot and bowl), fragment of a faience bead, five fragments of a wild boar's tusk. Dating: Early Bronze Age. Literature: Banasiewicz 1990, 213, 216, 218.

9. Sickle made of Volhynian flint, distal end snapped off. Dimensions: length 12.8 cm, width 5.8 cm, thickness 1.1 cm. Grave 4. The funerary pit was in the shape of a rectangle contained a skeleton of a man who died aged approx. 55, lying extended and supine, with the head to the north. Grave goods: four clay vessels (two amphorae, bowl, pot), three faience beads, a flint arrowhead. Dating: Early Bronze Age. Literature: Banasiewicz 1990, 217-218.

10. Sickle made of Volhynian flint, distal end snapped off, the object broken in two. Dimensions: length 12 cm, width 5 cm, thickness 0.9 cm. Grave 13. The burial pit, 290 × 100 cm, in shape resembling a rectangle with rounded corners, was situated along the W-E axis. At the bottom of the pit was a skeleton of a woman who died aged approx. 23-24, out of anatomical order and mixed up. The skull was found in the east part of the pit. One part of the sickle was by the skull, the other one – near the vessel in the centre of the grave. Grave goods: a clay bowl, 100 faience beads, a copper pin, two copper plates with perforations, a temple ring made of copper wire, seven bone beads with incisions, two bone tubes, six bone pipes, six pendants made of shell, four bone pendants. <sup>14</sup>C dating: 3575±35 BP. Literature: unpublished; documentation Niedźwiedź *et al.* 2001; Lorkiewicz-Muszyńska *et al.* 2021, 229-230.

**Hrebenne, site 10** – the was site discovered in the course of surface surveys in 1982. It was situated on the edge of a small, unnamed stream. In 1992, following reports about destroyed graves, W. Koman conducted rescue works which yielded one grave. In 1997, M. Polańska discovered another 12 graves, including two graves of the Strzyżów culture (Polańska 1998, 75-85).

11. Sickle made of Volhynian flint, distal end snapped off (Fig. 7). Dimensions: length 12.4 cm, width 4.2 cm, thickness 1.2 cm. Grave 1. The burial pit shaped like an elongated oval was situated on the NE-SW axis, and was destroyed due to ploughing and by an amateur discoverer. At the bottom of the pit was a skeleton, lying extended and supine, with the head to the south-west. The sickle was discovered by the right tibia. Grave goods: none recorded. <sup>14</sup>C dating: 3345±40 BP. Literature: Koman 1992, 22-24.

**Hrebenne, site 31** – the site was discovered by S. Jastrzębski in the course of surface surveys conducted in 1984. It encompasses the edge of a headland in the basin of a small,



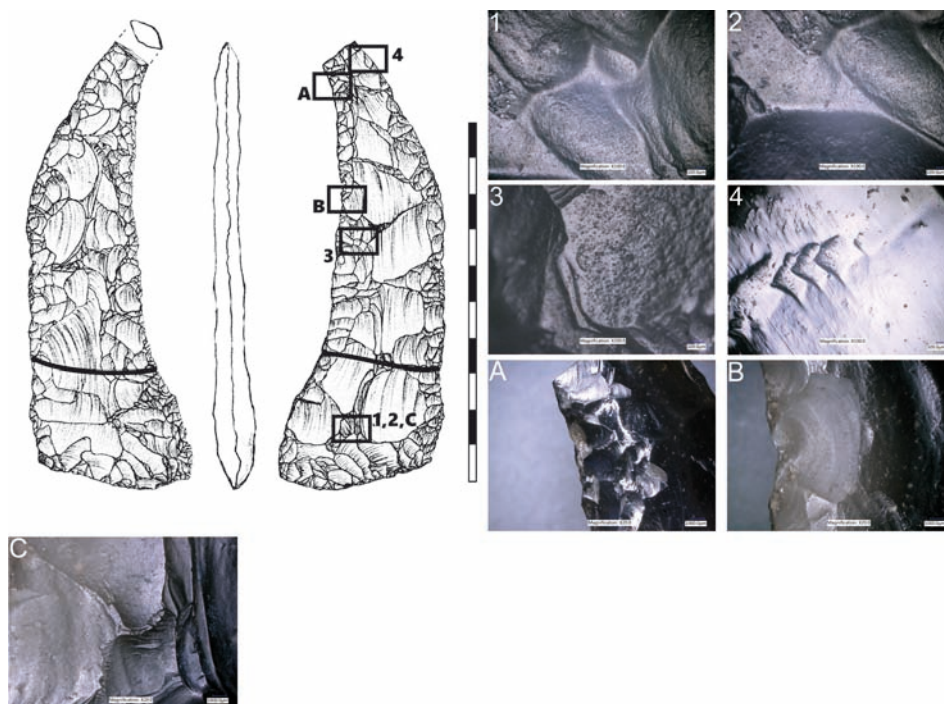


Fig. 7. Hrebenne, site 10, grave 1.

1-2, C – hafting traces, 3-4 – traces related to cereal harvesting, A – character of the working edge, B – chip scars with no use traces

nameless stream running through Hrebenne and joining the Bug. In 1991, following the reports about clusters of pottery and bones on the surface, W. Koman conducted rescue works which yielded a grave of the Strzyżów culture. He resumed research in 1993, in the course of which another three graves were discovered.

12. Sickle made of Volhynian flint, distal end snapped off. Dimensions: length 9.5 cm, width 4.2 cm, thickness 1.3 cm. Grave 1. The burial pit was elongated along the N-S axis, in its southern part – irregular in shape, roughly oval; in the northern part – rectangular. The skeleton was lying extended and supine, with the head to the south. While the lower limbs were in anatomical order, the upper part of the skeleton, above the pelvis, was mixed up. The sickle was lying on the foot bones. Grave goods: three vessels (amphora, bowl and pot). Dating: Early Bronze Age. Literature: Koman 1991, 13-14.

**Świerszczów, site 5** – the site was discovered during farm works and subjected to rescue investigations in 1984. These, conducted by A. Kokowski and W. Koman, yielded a grave of the Globular Amphorae culture (Ścibior *et al.* 1991, 80-84). In 2014, two graves of the Strzyżów culture were discovered during construction of a ring road around Hrubieszów.

13. Sickle made of Volhynian flint, distal end snapped off. Dimensions: length 13.7 cm, width 5.5 cm, thickness 1 cm. Grave 1. The burial pit, 286 × 114 cm, in shape resembling a rectangle with rounded corners was situated along the W-E axis. A skeleton of a woman who died aged between 20 and 25, was laid at the bottom of the pit, extended and supine, with the head to the west. The sickle was by the left femur. Grave goods: four clay vessels (two amphorae, pot, cup), two copper temple rings, five copper rings, five copper beads, 89 faience beads, two beads made of shell, a bone pin with an eye, a bone pendant, animal bones. Dating: Early Bronze Age. Literature: unpublished, documentation Jączek 2014; Lorkiewicz-Muszyńska *et al.* 2021, 239-241.

## RESULTS OF ANALYSIS

The sickles singled out for analysis represent the sub-triangular type as classified by J. Libera (2001). They are lenticular in section and their dimensions do not exceed 9.5-14.5 × 4-5.8 cm. The surface of two specimens – from grave 12 in Rogalin and grave 2 in Hrubieszów-Podgórze – bear traces of polishing.

The group of sickles which underwent microscopic analysis appears to be remarkably uniform in terms of their function. Out of 13 bifacial tools subjected to use-wear analysis, 12 artefacts exhibit similar use traces and marks indicating the presence of hafting. Only one specimen – recorded in grave 8 at the cemetery in Rogalin – does not exhibit any use traces – it was not used for any activities which would leave permanent traces on the flint surface. The knife was probably produced directly before its deposition in the grave as one of the grave goods.

All 12 sickles exhibit major use-traces associated with the processing of siliceous plants, above all cereals. They appear in the form of mirror-like polishes and have “flat” textures. Within the sheen one can observe numerous linear traces, running (in various directions) parallel and diagonally in relation to the working edge of the implement. This evidence indicating that the tool was used for harvesting plants is discernible on large areas of the surfaces in their upper and medial parts. However, they are most prevalent on the distal ends and along the working edges. The boundary between the working part and the hafted one is very distinct. Upon inspection, it can be assumed that the end of the haft ran transversely or diagonally in relation to the axis of symmetry of the sickle. Moreover, due to the presence of another type of microscopic traces recorded in the lower parts of sickles it was possible to determine the form of hafting, most likely made of harder materials, such as antler or bone. The flint surface, though, was in direct contact with a soft material – hide, or, in some instances, probably plants. Traces indicating such solutions were recorded mostly on the protruding parts – ridges on the bases of sickles. They are mostly in the form of polish, which resembles that resulting from contact with hide or plants and which also displays groups of linear traces, which corroborate the fact that the flint implement moved in the haft.

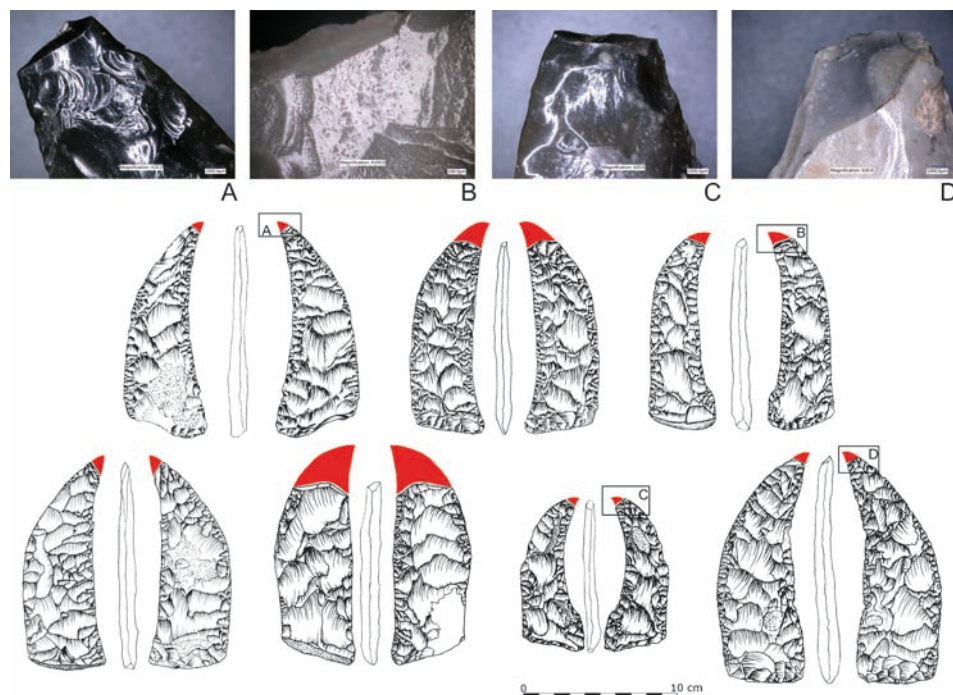


Fig. 8. Marks resulting from snapping off distal ends of sickles from Rogalin, site 15.

A – grave 1, B – grave 6, C – grave 12, D – surface of the site, probably comes from a destroyed grave

It is noteworthy that some sickles bear small flake or chip scars, which run along the working edge or form the backed edge, and which do not exhibit any use traces (but occur between parts used while harvesting cereals). This might indicate that before their deposition in graves, bifacial tools were “repaired” by retouching individual near-edge parts. Moreover, after sickles were used for cereal processing, their distal ends were snapped off – the scars resulting from such treatment do not bear any microscopic traces (Fig. 8).

The presented results of use-wear analysis largely correspond with functional studies of sickles from the Early Bronze Age published in the literature. Such flint implements should be associated with the processing of silica-rich plants – mostly harvesting cereals, though similar specimens are sometimes related to activities connected with obtaining reeds or cutting peat, which might have been used to insulate dwelling houses (*cf.* Balcer and Schild 1978a; 1978b; Van Gijn 1988; 2010; Baron and Kufel-Diakowska 2013; Grużdź *et al.* 2015; Grużdź *et al.* 2017; Pyżewicz and Grużdź 2019). Results of use-wear analysis of sickles from cemeteries of the Strzyżów culture in Raciborowice Kolonia published recently confirm the use of such articles in harvesting cereal, cutting sod, and even ploughing (Wolski 2020, 99–111). At the same time, it cannot be excluded that analysed sickles were

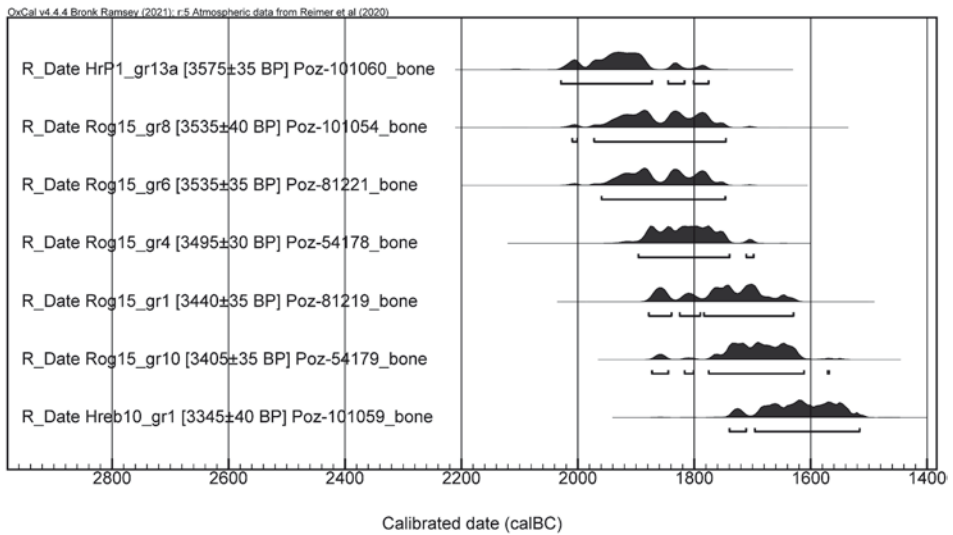


Fig. 9. List of radiocarbon dates for graves of the Strzyżów culture. Based on the programme OxCal v4.3.2

used by the Early Bronze communities for other purposes, as a result of which they do not bear permanent traces, this having already been indicated in literature concerning similar tools (Bąbel 1974; Bąbel and Budziszewski 1978; Bąbel 2013, 104). However, at the present stage of research we do not have reliable or convincing data supporting this assumption.

Among 13 burials containing sickles discussed in this text, seven underwent radiocarbon dating (Fig. 9). Generally, their dating is set within the range 2000-1500 BC. The oldest inhumations containing artefacts of this type are grave 13 in Hrubieszów-Podgórze and graves 6 and 8 in Rogalin. Bones from grave 13 are dated to 2029-1874 BC, with the probability being 87.7%. Graves 1 and 4, as well as grave 10 from the same site, which is rich in flint materials, are younger. The youngest burial containing a flint sickle is grave 1 from site 10 in Hrebenne; this artefact was the only item deposited with the deceased. Bones from this grave are dated to 1699-1527 BC, with the probability being 88.1%. It is the youngest of all  $^{14}\text{C}$  dates published for the Strzyżów culture.

## SUMMARY

In the light of the presented results, the analysed sickles were undoubtedly articles of everyday use, and were used mostly for harvesting cereals or other siliceous plants. This might indicate the sedentary, agricultural character of the economy, geared towards farming



plants on the fertile lands occupied by the Strzyżów culture. Use-wear analysis also revealed that these objects, suitably altered (by repairing the working part and damaging the distal part) became important grave goods. Sickle tips were destroyed right before being deposited in a grave, as indicated by the fact that the snapped off parts do not display characteristic polish which results from their use. In many instances, the degree of damage would make it possible to repair and use them, yet the ritual necessitated their deposition in a grave in this form. This custom is in accordance with the funeral rituals of the Strzyżów culture. In addition, the results of the analysis conducted expand our knowledge about bifacial tools.

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