

## **Determinants of gender and age in graves tarnobrzeg lusatian culture in the light of statistical analysis/Wyznaczniki płci i wieku w grobach tarnobrzegskiej kultury łużyckiej w świetle analiz statystycznych**

### **Scientific objective of the project (problem which the applicant intends to resolve, research hypotheses put forward)**

The main objective of this research project is to check, using methods of statistical analyses, whether in the cemeteries of Tarnobrzeg Lusatian culture there were any elements which could be considered as determinants of gender or age. It can be assumed that this type of determinants existed, as we do not know societies which did not manifest these issues (E. Nowicka 2006, pp. 306-307).

Tarnobrzeg Lusatian culture was developing on the territory of the south-eastern Poland. Its southern border was indicated by the upper course of San River, its western border was valley of Wisłoka River, northern one - Vistula River, and the eastern one - lower and middle course of San River (S. Czopek, 2009, p. 16 Fig. 1). It has developed from the third period of Bronze Age until the beginning of early Iron Age (S. Czopek, 2009, p. 24). This is one of the best researched cultural units included in the circle of urnfield cultures. Its characteristic feature was great cemeteries, which existed even for several hundred years.

The most important introductory element will be to gather data on subjects found in the graves of these cemeteries, which have their anthropological analyses. The next step will be contrasting this information against each other. Again, at this point, the condition of anthropological research needs to be considered as very good. Therefore, the primary criterion of selecting cemeteries for more detailed analysis will be the abundance of graves and anthropological analyses.

In this place we need to refer to the reviewers' comments taken from the previous application, who state that anthropologic analyses do not always give reliable results and may lead to false results. Naturally, we cannot be certain that the anthropologists' analyses are always correct, however no research proceedings which are more objective have been developed in relation to **bulk materials**, and therefore replacing them is not possible. Only defining any cultural determinants of the age and gender, which this project is to lead to, may allow us to verify them or to diagnose them in greater detail e.g. using methods of molecular biology. What needs to be stressed, is the fact that the statistical approach to this topic eliminates individual anthropologists' mistakes.

The first stage of analysis is going to be based on creating a catalogue of objects originating from all cemeteries of the Tarnobrzeg Lusatian culture which, due to the presence of anthropological research, will be useful (base for statistical and archaeological analyses). Each element of grave will be examined, starting with urns, through the bowls covering the urns, and ending with metal and bone items. It is worth noting, that the urns will be of particular importance as they often constituted the only component of the grave. It is difficult to believe that such an important vessel, essential for burial rite in the entire circle of urnfield cultures, was devoid of information on social status, family status and finally age and sex of the deceased. We assume, therefore, that in the extensive design (various shapes and ornaments) and in the size of urns certain indicators of our interest, regarding age, sex and possibly social status are "hidden".

After creating a database containing such features such as e.g. depth of a burial, a type and size of an urn, its ornamentation or type of bronze object. We will be able to move to relevant analyses of a statistical character (more information in testing methods) and create appropriate statistical models on the basis of selected characteristics to specify age or gender.

Also spatial analyses will be important, in the case of cemeteries of Tarnobrzeg Lusatian culture they can give very interesting results, because of the significant variation in the burial arrangement in the cemeteries of this culture. Here we have three main types of systems: clustered, closed, and mixed, analysis of which will require the adoption of varied research methods. It is worthwhile to at least check whether, in the cemetery space, there were any separate rules of burying the bodies of women and men with a use of typologically and functionally specific objects (artifacts).

It is also impossible to rule out the fact that placement of certain object in relation to the urn was of importance, and thus also this element will require verifying.

Also the burial rite itself will require studying. In Tarnobrzeg Lusatian culture, although urned burials dominated, there were also graves in which remains were spread around the urns, were placed under urn, a part was situated inside the urn and a part was outside of the urn, and finally in the early stages of development there were inhumations (S. Czopek 2002). It cannot be excluded that also these elements of funeral rituals may be derived from special ritual used for specific people. Here, however, it is worth noting that, in the case of inhumations, wider analyses may not meet the expectations due to rare cases of anthropological analysis of poorly preserved bones.

On the basis of detailed analyses an attempt of regional reasoning will be performed. It is worth checking whether on the cemeteries functioning at the same time there were the same (or other) principles of equipping the deceased, for instance in the ceramic design. Any differences, but also elements and features appearing repeatedly in the "neighbouring" necropolises may be a good basis for a debate on the social relationship - for example the existence (or lack) the marital exchange with specifying its likely directions.

These differences may also be due to regional differences. In this context we have a fairly important material for the analysis of regional diversity of communities of Tarnobrzeg Lusatian culture. The existing studies in the field of interpretation of the cemeteries of our interest indicate that, one necropolis was used by dozens of people at the same time (K. Trybała-Zawislak, 2012a, pp. 189-190), probably creating a few "families", many of which were related to each other. The dominant types or characteristics of the vessels may be interpreted as an element of social identification (belonging to the family).

The author will try to indicate the objects that can be used as determinants of social prestige and position. Again it is difficult to imagine that such elements do not exist (S. Wróbel 2001, p. 79) and that they have no connection to age and sex.

The existence of such vessels, and of some forms which might have been tied to specific families, may be confirmed by recent analyses for the cemetery in Grzęska, where, within certain clusters, certain vessels more similar to each other or particular elements could be indicated (S. Czopek 2015, pp. 81-87). Taking into account connection of those clusters with families, it seems that family forms of urns are very likely.

In conclusion, we can make the following research objectives (and also steps of research):

1. Creating a catalogue of objects originating from all cemeteries Tarnobrzeg Lusatian culture which, due to the presence of anthropological research, will be useful (base for statistical and archaeological analyses).
2. Statistical analysis of the impact of various tested characteristics (e.g. anthropological characteristics (weight of remains), types of vessels, their decorations, type of metal objects) for their impact on gender and age of the deceased (correlation between age, gender and other measured characteristics, correlations between characteristics which significantly influence gender and age) (Pearson coefficient, Spearman coefficient, contingency analysis, Mann-Whitney tests, Kruskal-Wallis tests, Friedman tests, variance and covariance analysis)
3. Construction of statistical models to allow identification of gender or age on the basis of certain selected features (regression models, e.g. multiple, logistic regression) both in many necropolises and within the selected ones.
4. Spatial analyses of the necropolises showing various important relations between a tested feature (e.g. type of an object) and its location within the necropolis.
5. Verification whether there is a statistically significant correlations between selected features and prestige measured in richness of a burial.
6. Verification whether there were any statistically significant regional differences in necropolises in terms of selected characteristics (e.g. burial place inventory).
7. Proposing a synthetic approach, emphasising widely understood social relationships on the one hand and funeral tradition on the other.

**Importance of the project (the current state of knowledge, justification of research problem, justification of novel character of research, importance of the results of the project for the development of a given branch of knowledge, scientific discipline and civilizational development)**

As previously mentioned the Tarnobrzeg Lusatian culture is one of the best-recognized archaeological units identified within the circle of Urnfield cultures. In the topic of relation between burial equipment and age and sex we, of course, also have own research. The work of Marcin Przybyła regarding certain aspects of a burial rite (M.S. Przybyła 2004) is worth mentioning here. This work dealt with the relationships between types of burial and age or sex of the dead. To a certain extent it also analysed the presence of bowls, attachments or objects made of bronze. That was, however, only a short article which by no means exhausted the subject but rather just introduced the key issues. However this work pointed to the

connection of rim ornaments with burials of women, also frequent presence of pins and small ornaments within women's grave inventories was mentioned (M. S. Przybyła 2004, pp. 98-100).

The characteristic feature specific only to the burial rite of Tarnobrzeg Lusatian culture was so-called San ceramic design, which emerged in the so-called San vases, Zbydniów bowls and San jugs. Krzysztof Ormian's doctoral dissertation was devoted to it (K. Ormian 2008). It is a characteristic for the second phase of development of this cultural unit and is not present outside the area occupied by it. In this dissertation, among others, also relations between the age and sex of the dead and this design were discussed (K. Ormian 2008, pp. 238-239), however, no relationship between these characteristics was claimed there.

Another element under further analysis was connection between the age and certain elements of burial rite. Here we have primarily two works by Katarzyna Trybała-Zawiślak, one regarding children (K. Trybała-Zawiślak 2004), and the other regarding elders (K. Trybała-Zawiślak 2006).

An important element of graves of Tarnobrzeg Lusatian culture were the bowls. This topic was also analysed earlier by Katarzyna Trybała-Zawiślak (K. Trybała-Zawiślak 2012b).

Another, quite widely recognized and from the project perspective important element needs to be mentioned, and it is layout of the graves in cemeteries. In the case of the unit of our interest there are at least two main systems: clustered and closed, plus the third, which combined features of the first two. Here the clustered system was analysed most precisely. In principle it is that clusters of graves mirrored systems of family-corporate character (K. Trybała-Zawiślak 2011). You can assume that there was a direct link between individuals buried in a given cluster, and, as previously mentioned, the link with certain specified types of vessels (S. Czopek 2015).

Also Teresa Rysiewska's paper regarding family structures in prehistoric communities must not be omitted (T. Rysiewska 1996). In her work, the researcher used, among others, some cemeteries of Tarnobrzeg Lusatian culture. Although she was not able to demonstrate relationship between age or sex of the dead, and a wealth of inventory, however, it has been demonstrated that you can find some permanent and repeating elements in each cemetery. Any derogation can be considered, as burials of the people who arrived from "outside the village" and buried according to specific customs specific for their place of origin (T. Rysiewska 1996, pp. 234-235). It is also important, that it was possible to capture correlation between location of the attachments and the age and sex of the deceased (T. Rysiewska 1996, p. 236).

It is impossible not to mention the issue of the state anthropological research of the cultural unit of our interest. So far data regarding eight major cemeteries which have such analyses have been used. They were Pysznica 1 (S. Czopek 2001; J. Wrobel 2001), Bachórz Chodorówka 1 (M. Gedl 1994; B. Szybowski, E. Wisniewska 1989a), Grodzisko Dolne 1 (S. Czopek 1996), Chodaczów 2 (S. Czopek 1996; B. Szybowski 1996), Knapy 6 (S. Czopek 2004), Zbydniów 1 (K. Moskwa 1979), Kłyżów 2 (K. Trybała-Zawiślak 2012), Wierzawice 4 (J. Adamik, M. Burghardt, W. Rajpold 2016), Furmany 1 (K. Ormian 1998). Unfortunately, except for Kłyżów 2 in no case were all burials subject to anthropological analyses, and in addition, only in part of the cases the age and sex could be determined. In spite of the above, these 10 cemeteries gave over 2,000 graves with anthropological analyses which is already a really large number, ensuring the validity of statistical analyses.

The last element associated with cemeteries, which will be of crucial importance for the project is the time factor (S. Czopek 2006, table 1). The status of research can be assessed as good. We have a number of well-studied, large cemeteries, for which we have a significant amount of dating materials (including C14), which enable us to outline the chronology of cemeteries functioning, as well as, very important from the point of view of the project, internal (relative) periodisation of each of the sites.

The value of the project is primarily the result of a new approach to the funeral sources, which has not been implemented in the proposed form in any of the local groups of the entire Lusatian cultural circle. In this context the case study of one cultural group may have a great importance for the whole cultural province of Central Europe and a part of Western Europe. Status of knowledge of funeral materials of the Tarnobrzeg Lusatian culture is so advanced, that allows for a more in-depth studies using quantitative methods (in this case, developed statistics and comparative analyses). It is to be hoped that the results achieved will allow to:

1. Developing a new direction of analysing and drawing conclusions in reference to mass funeral sources of poorly drawn formal characteristics (what characterises all urn communities).
2. Testing statistical methods on large series of historical materials, together with establishing their suitability for drawing conclusions in the field of funeral features and reconstruction of a model of social relations.
3. Establishing relevant (significant) characteristics of historical material, statistically validated, important from the point of view of sex and/or age of the dead.

4. Formulating clear conclusions regarding organization of the society in the Tarnobrzeg Lusatian culture on the basis of funeral materials of micro scale (individual sites), meso scale (neighbouring necropolises) and macro scale (set of all cemeteries).

### **The concept and the research plan (general research plan, detailed research objectives, results of preliminary examinations)**

The main objective of the project will be to check whether there were any objects which might have constituted determinants of age or sex within the grave inventories Tarnobrzeg Lusatian culture. Another objective is to determine whether such objects could be determinants of not only biological sex but also cultural gender. It is important to draw attention to the artifacts of prestigious nature and spatial analysis of the necropolises.

Generally the first and already commenced stage is collecting information on the artifacts found in the graves Tarnobrzeg Lusatian culture. The source basis will be 10 cemeteries (for which we have anthropological analyses) from different phases of this group (in total giving a full range - from its inception to its demise, i.e. from the third period of bronze age to the younger part of the hallstatt period), i.e. :

1. Bachórz Chodorówka 1, pow. rzeszowski- 789 graves (M. Gedl 1994)
2. Pysznicza 1, pow. stalowowolski- 772 graves (S. Czopek 2001)
3. Furmany 1, pow. tarnobrzegi- 347 graves (K. Ormian 1998)
4. Knapy 6, pow. tarnobrzegi- 231 graves (S. Czopek 2004)
5. Zbydniów 1, pow. stalowowolski- 223 graves (K. Moskwa 1979)
6. Kłyżów, pow. stalowowolski- 209 graves (K. Trybała- Zawiaślak 2012)
7. Tarnobrzeg- Mokrzeszów 2, pow. tarnobrzegi- 173 graves (K. Trybała- Zawiaślak 2012)
8. Grodzisko Dolne 1, pow. leżajski- 143 graves (S. Czopek 1996)
9. Chodaczów 2, pow. leżajski- 111 graves (S. Czopek 1996)
10. Wierzawice 4, pow. leżajski- 21 graves (K. Moskwa 1984; J. Adamik, M. Burghardt, W. Rajpold

2016)

Successive stages of research will include:

1. Establishing a system of classification of materials (ceramics, metals) and characteristics (e.g. in the design of ceramics), taking into account their functions (urns, cover bowls, attachments, grave gifts) in the grave assemblages.

2. Classic analyses of a statistical character, among others the correlation between age, gender and various characteristics, both quantitative (e.g. quantity of remains) and quality (e.g. type of urn and its decoration). To determine the relations we will use various coefficients and tests selected to the type of characteristics, e.g. Pearson, Spearman and contingency coefficients, Mann-Whitney, Kruskal-Wallis, Friedman tests, variance and covariance analyses). Construction of statistical models to allow identification of gender or age on the basis of certain selected features (regression models, i.a. multiple, logistic regression) both in many necropolises and within the selected ones.

3. Studies of spatial deployment of the elements and characteristics which are statistically significant. A model of such reasoning is to be carried out for each necropolis separately.

4. The next step is an attempt to compare the results obtained and reaching synthetic conclusions:

- a) important from the source knowledge point of view (relevant/not relevant features of historical material, which are/are not determinants for sex and/or age of the dead.
- b) relevant from the point of view of the funeral interpretation - ritual features assigned to sex and/or age.
- c) interesting for reconstruction of social structure and relationships (including foremost spatial).

Hitherto preliminary tests included analyses regarding the relation of size of urns have been carried out (according to the original, own method), which gave very interesting conclusions with regard to the relation of this feature with the age of deceased, in particular, connecting small urns with children and large ones with adults. This gave the possibility to indicate within collective graves, in which the position of "dominant" individual was obtained by a child or an adult. Also bronze and iron pins were attempted to be connected to gender and age of a deceased. However, here the presence of pins itself has not given us unambiguous relation of these accessories with gender or age. They appeared relatively more often in women's burials, though. Furthermore, more unique forms of pins (such as pastoral-headed or in a form of a spiral disc) can be significantly more often connected to women than in the case of more popular ones (with head hammered together and coiled).

### **Research methodology (method of carrying out the research, methods, techniques and research tools, methods of analysis and the development of results, machinery and equipment used in research)**

As for the methods, advanced statistical analysis with statistical models are going to be used, naturally. However, it needs to be immediately noted that this type of research despite undoubted usefulness AND professional handbooks for archaeologists (M. Fletcher, G.R. Lock 1995), in Polish archaeology it is still in its infancy, especially with regard to the materials from the Bronze Age or the early Iron Age. You can even be said that statistics paralyzes minds of even very illustrious archaeologists. It is therefore very difficult to find research of a similar scale to the one described here. The author has to prepare research methodology on his own, having access to a relatively limited set of similar papers. However, certain papers which use statistical analyses need to be mentioned (Ł. Mrówka 2011; M. Cwaliński, J. Niebieszczański 2013).

The analysis will be carried out with a use of STATISTICA 12 software suite. It allows you to perform all the necessary research, such as correspondence analysis, cluster analysis, correlation analysis and regression analysis (statistic modelling). For spatial analysis the author will use Quantum GIS 2.18. This software is generally used for all kinds of spatial analysis, including the analyses of settlements and cemeteries. It allows easy calculation of the closest neighbourhood coefficient. It enables measurements of the distances between the particular points and marking the density of occurrences of given phenomena. In general these two software programs are the only specialized software necessary for this project.

The original method of determining the size of vessels (mainly urns) needs to be explained further. In general none of the statistical methods has been used here, and four measurable dimensions were taken into account: height, belly diameter, bottom diameter and rim diameter. These results were added to each other, and then divided by 4. In such a way a **score indicator of the size of the vessel** was calculated. This method is very simple and allows for easy and quick calculation of large batches of material. In addition, in order to check its functioning, in respect of the material from the cemeteries in Pysznica, Bachórz, Chodorówka and Kłyżów the volume of the vessels was calculated. These calculations using the method of score indicator and volumetric method gave identical results. In the case of other categories such as metal objects, various scoring systems were applied to convert individual elements of a grave equipment to a score gradation.

As for statistical analysis, first we are going to create a database for detailed statistical analysis with a use of characteristics distribution presentation and statistical multidimensional analyses (e.g. correspondence analysis, aggregate analysis) Among others we are going to group types of objects, types of decoration, types bronze objects.

To create a model that identifies gender and age on the basis of the selected features. At the beginning, we going to examine mutual connections of characteristics with age and sex as well as interactions between traits influencing the age and gender in substantial way. In the study we are going to use the correlation theory (Spearman factor,  $\chi^2$  test for quality characteristics and contingency factor) and tests adapted to data and showing the differentiation of quantitative characteristics (e.g. vessel dimensions) by sex and age (analysis of variance or its non-parametric equivalents, Mann-Whitney tests, Median test, Kruskal-Wallis test). Then we are going to use models of regression properly matched to the type of data (e.g. logistic regression (logit function)). And we are going create algorithms enabling identification of gender and age of deceased persons on the assumption that we have information about the selected features. For our analyses we will use both quantitative data (e.g. quantity remains, the size of the vessel, depth of burial) and qualitative data (types of urns, type of ornamentation). Among data there will also be so called data in rangable scale (how rich the burial was, how many bronze elements were there) and binary data (e.g. sex, occurrence of adornments). In the case of quantitative characteristics, such as size of urns, bowls, and utensils, we are going to present basic parameters both in case of data in its entirety and per group e.g. gender. We are going to verify the normality of distribution. By applying appropriate tests and correlation coefficients we are going to examine their relationship to other quantitative and qualitative characteristics.

In spatial analysis of necropolises, we are going to analyse various important relations between any particular feature and its location within the cemetery. We are going to use for this purpose a data analysis based on the selected concentration coefficients (e.g. Lorenz coefficient) and the abovementioned statistical tests.

To verify which statistically significant features affect the prestige we are again going to employ correlation theory, previously listed statistical tests and multiple regression model.

Similar methods we are going to use to determine whether there were statically significant regional differences between necropolises in terms of selected characteristics (e.g. size, type and way of decorating urns, richness of burial or types of metal objects).

In any case of analysis, used statistical methods (tests, regressions and correlation coefficients) are going to be selected for such characteristics, their distribution and meeting the assumptions enabling employment of a given method of analysis. Analysis of the correspondence is going to be used to create new (independent from each other) variables, which can significantly affect the characteristic you selected, from a

given characteristics or a set of characteristics. Analysis of agglomerates is going to be used to establish any similar objects (e.g. cemeteries) in terms of selected features.

The conclusions of the examination will be presented in the form of various tables catered for conclusions (correlation matrix, contingency tables), diagrams (box and whisker plot, trees of similarities), the mathematical formulae describing regression models, algorithms (e.g. identification of gender and age).

## Literatura

### **Adamik J., M. Burghardt, W. Rajpold**

2016 Materiały kultury trzcinieckiej i tarnobrzesckiej kultury łużyckiej ze stanowiska Wierzawice 4 w świetle analiz archeologicznych „MSROA” t. 37 w druku.

### **Cwaliński M., Niebieszczanski J.,**

2013 Kurhanowy obrządek pogrzebowy kultury mogiłowej na terenach południowo-zachodniej Polski. Konstrukcja kurhanów i ich położenie w krajobrazie, „Fontes Archaeologici Posnanienses” t. 49, s. 107-144

### **Czopek S.**

1996 *Grupa tarnobrzescka nad środkowym Sanem i dolnym Wisłokiem*, Rzeszów.

2001 *Pysznica pow. Stalowa Wola stanowisko 1- cmentarzysko ciałopalne z przełomu epok brązu i żelaza*, Rzeszów.

2002 Inhumacja i kremacja na cmentarzyskach grupy tarnobrzesckiej, [w:] Wrzesiński J. (red.), „Popiół i kość, Funeralia Lednickie”, nr 4. Sobótka-Wrocław, s. 231-246.

2004 *Cmentarzysko ciałopalne z wczesnej epoki żelaza w Knapach*, Rzeszów.

2006 Czas użytkowania cmentarzysk tarnobrzesckiej kultury łużyckiej – możliwości interpretacyjne i uwagi dyskusyjne, „Analecta Archaeologica Ressoiviensia”, t. 1, s. 101-132.

2009 Aktualne problemy w badaniach tarnobrzesckiej kultury łużyckiej [w:] Czopek S. Trybała-Zawiślak K. (red.), „Tarnobrzescka kultura łużycka- źródła i interpretacje”. Rzeszów, s. 15-29.

2015 Settlement and funerary microstructures in the studies on prehistoric societies. The case of Tarnobrzeg Lusatian Culture. „Sprawozdania Archeologiczne”, s. 77-100.

### **Czopek S., Ligoda J., Podgórska-Czopek J.**

2009 Sprawozdanie z badań wykopaliskowych przeprowadzonych w 2008 roku na stanowisku nr. 1w Grzęsce, pow. Przeworsk „MSROA” t. 30, s.149-161.

### **Fletcher M., Lock G. R.,**

1995 *Archeologia w liczbach podstawy statystyki dla archeologów* Poznań.

### **Gedl. M**

1994 *Cmentarzysko z epoki brązu w Bachórze-Chodorówce*, Kraków.

### **Gedl M., Szybowicz B.**

2002 Badania nad różnicowaniem struktury demograficznej i stanu biologicznego populacji kultury łużyckiej, zamieszkałych w różnych warunkach środowiskowych, [w:] M. Gedl (red.) *Wielkie cmentarzyska z epoki brązu i wczesnej epoki żelaza*, Warszawa, s. 49-61.

### **Kadrow S.**

2008 Gender-differentiated burial rites in Europe of the 5th and 4th millennia BC: attempts at traditional archaeological interpretation “Analecta Archeologica Ressoiviensia” t. 3, s. 49-95.

### **Moskwa K.**

1979 Cmentarzysko ciałopalne kultury łużyckiej w Zbydniowie, gm. Zaleszany, woj. Tarnobrzeg, „MSROA za lata 1973-1975”, s. 3-57.

1984 Badania zwiadowcze na stanowisku nr. 4 w Wierzawicach, gm. Leżajsk, Woj. Rzeszów, „MSROA za lata 1976-1979” s. 41-49.

### **Mrówka Ł.**

2011 Development of pottery style on the Bronze and Early Iron Age cemetery at Kietrz, Głubczyce district, in the light of statistical analyses, “Recherches Archéologiques”, t. 3, s. 67-100.

### **Nowicka E.**

2006 *Świat człowieka - świat kultury*, Warszawa.

### **Ormian K.**

1998 *Cmentarzysko z epoki brązu i wczesnej epoki żelaza w Furmanach stan. 1, woj. Tarnobrzeg* Maszynopis pracy magisterskiej UJ, Kraków.

2008 *Stylistyka nadszańska ceramiki tarnobrzesckiej kultury łużyckiej*. Maszynopis pracy doktorskiej w UR, Rzeszów.

### **Ormian K., Brylska M. Guściora J. K.**

2001 Cmentarzysko z epoki brązu i wczesnej epoki żelaza w Furmanach, stan 1, pow. Tarnobrzeg, województwo podkarpackie, „MSROA” t. 22, s.295-312.

### **Przybyła M. S.**

2004 Wybrane aspekty obrządku pogrzebowego grupy tarnobrzeskiej, „MSROA”, t. 25, s. 91-103.

**Rysiewska T.**

1996 *Struktura rodowa w społecznościach pradziejowych: Cmentarzyska z epoki brązu i wczesnej epoki żelaza w południowej Polsce*, Wrocław.

**Szybowicz B.**

1996 Analiza antropologiczna i demograficzna szczątków kostnych z cmentarzyska grupy tarnobrzeskiej w Chodaczowie, stanowisko 2, [w:] J. Chochorowski (red.) *Problemy epoki brązu i wczesnej epoki żelaza w Europie Środkowej. Księga jubileuszowa poświęcona Markowi Gedlowi na pięćdziesięciolecie pracy w Uniwersytecie Jagiellońskim*, Kraków, s. 481-488.

**Szybowicz B., Wiśniewska E.**

1989a Wyniki badań antropologicznych i demograficznych z cmentarzyska ciałopalnego grupy tarnobrzeskiej z Bachorza Chodorówki, stan I, woj. Przemyskie, [w:] Barłowska A, Szałapata E (red.), „*Grupa tarnobrzeska kultury łużyckiej*” (t.2). Rzeszów, s. 431-452.

1989b Badania nad strukturą populacji grupy tarnobrzeskiej [w:] Barłowska A, Szałapata E (red.), „*Grupa tarnobrzeska kultury łużyckiej*” (t.2). Rzeszów, s. 503-520.

**Trybała-Zawiślak K.**

2004 Groby dziecięce na cmentarzyskach grupy tarnobrzeskiej, [w:] Wrześniński J., W. Dzieduszycki (red.) *Dusza maluczka, a strata ogromna. Funeralia Lednickie*, nr 6, Poznań, s. 231-242.

2006 Groby osobników w wieku senilis na cmentarzyskach tarnobrzeskiej kultury łużyckiej, [w:] Wrześniński J., W. Dzieduszycki (red.), *Starość- wiek spełnienia: Funeralia Lednickie*, nr 8, Poznań, s. 107-113.

2011 Rozplanowanie grobów na cmentarzyskach tarnobrzeskiej kultury łużyckiej ze szczególnym uwzględnieniem nekropolii w Kłyżowie, Maszynopis pracy doktorskiej w UR, Rzeszów.

2012a *Kłyżów, stan. 2 i Mokrzyszów, stan. 2- cmentarzyska ciałopalne z wczesnej epoki żelaza*, Rzeszów.

2012b Groby z przykryciem popielnicy w tarnobrzeskiej kulturze łużyckiej, [w:] S. Czopek (red) *Hic mortui vivunt : z badań nad archeologią funeralną*, Rzeszów, s. 149-168.

**Wróbel J.**

2001 Analiza antropologiczna szczątków kostnych z cmentarzyska ciałopalnego grupy tarnobrzeskiej w Pysznicy, [w:] S. Czopek, *Pysznica pow. Stalowa Wola stanowisko 1- cmentarzysko ciałopalne z przełomu epok brązu i żelaza*, Rzeszów, s. 204-211.

**Wróbel S.**

2001 Problem definiowania władzy społecznej, „*Kultura i Społeczeństwo*” t. 1, s. 75-103.