A METHOD OF ANALYSIS AND VALORISATION OF HISTORIC GREEN SPACE ARRANGEMENTS IN RURAL AREAS IN POLAND

M. T. WALERZAK, D. SWIERK, M. KRZYZANIAK and P. URBANSKI
Poznan University of Life Sciences, Department of Horticulture and Landscape Architecture, 60-637 Poznan, Poland

Abstract

WALERZAK, M. T., D. SWIERK, M. KRZYZANIAK and P. URBANSKI, 2015. A method of analysis and valorisation of historic green space arrangements in rural areas in Poland. *Bulg. J. Agric. Sci.*, 21: 507–516

The development of one, complex method of analysis and valuation of garden estates is particularly important for the revalorisation and conservation of historic gardens, which are part of the European cultural heritage. The task is even more significant in view of the fact that many currently applied methods assessing the state of preservation of historic green space arrangements do not enable their complex valorisation and conservation. The aim of the study was to create a tabular method of analysis and valorisation of historic values in historic green space arrangements and to draw the attention of the users of those estates to the high value of historic gardens to the cultural landscape and to the regional and national identity.

The study was conducted on 14 historic green space establishments, which differed in their state of preservation. The estates under analysis were assessed by means of the suggested, innovative method of analysis and valorisation of historic values in historic green space arrangements. The results of the assessment were statistically analysed. As a result four CVA models were created.

Most of the estates under investigation were classified as estates of medium value and minimal degradation, which should be revalorised in consequence. The method suggested in the research proved to be very useful both in field and study work on the revalorisation of historic green space arrangements.

Key words: revalorisation, conservation, historic gardens, historic values, cultural heritage, statistical models

Introduction

The valuation of historic gardens is difficult but simultaneously it is an integral part of revalorisation work. The estimation of the value of a historic estate is significant to the cultural heritage, but it is also particularly important for revalorisation and conservation work. Many currently applied methods assessing the state of preservation of historic green space establishments do not enable their complex valorisation. A vast majority of the methods are related with elements of architecture, but there is not any uniform, generally accepted and objective method. The methodologies which have been applied so far are imprecise and they are often contingent. Too many varying assessment criteria result in data which are difficult to interpret. In consequence, there are no objective results, which would enable the comparison of estates with each other. Usually conservation registers and documentations tend to describe rather than analyse the value of monuments.

The problem of analysis and assessment of the value of historic estates is even more complicated when historic green space estates and arrangements are taken into account. The composition of historic garden estates combines a wide range of spatial elements. These are elements of architecture, landform, water and road systems, and above all, these are plant arrangements. In such estates plants are usually the main mass of the monument. Their dynamic variability, connected with the passage of time and with the fact that they are living matter, poses a wide range of problems related with correct valuation and assessment.

According to the provisions of the Florence Charter of 1981, a historic garden is an architectural composition whose basic material consists of plants – it is living matter which is subject to destruction and regeneration. As a monument, it should be protected according to the spirit of the Venice Charter, but because it is living matter, it is subject to the regulations included in the Florence Charter. The term 'historic garden' refers both to inconspicuous garden estates and to scenic parks. The protec-

E-mail: milosz.walerzak@up.poznan.pl; ktzmilos@up.poznan.pl

tion of historic gardens requires that they should be identified and inventoried. It also causes the need to take such actions as maintenance, conservation, renovation (restoration) and restitution. Each action with the purpose of maintenance, conservation, restoration or restitution of a historic garden or part thereof must take all elements of the historic estate into account. Each restoration or restitution action taken on a historic garden can be done after detailed analysis and collection of documentation concerning the estate. The studies should lead to conclusions. If a historic garden has completely disappeared, it is impossible to take restitution actions related with the idea of a historic garden. It is the duty of authorities to introduce legal and administrative regulations ensuring the identification, inventory and security of historic gardens. The authorities are also responsible for the implementation of financial decisions favouring maintenance, conservation, restoration and possible restitution ("The ICO-MOS-IFLA International Charter for Historic Gardens", 1981).

In view of the fact that historic gardens and parks are considered to be part of the European cultural heritage there were studies and an attempt to create a uniform, universal table for historic establishments, which would enable quick and objective valorisation (Säumel et al., 2010). Other authors also note that historic gardens and parks are also appreciated as sources of aesthetic and social values (Kümmerling and Müller, 2012). The lack of knowledge concerning works in historic gardens and parks causes the need to apply simple tools enabling valorisation of an estate. Revalorisation and reconstruction designs should be preceded with detailed analyses of source materials and with field analyses. Such analyses are necessary to avoid the risk of serious design errors, which may cause destruction of a historic estate or damage valuable specimens of plants growing in that area (Ignatieva and Konechnaya, 2004). A historic estate is a carrier of identity of that place and it is also a record of its historic values, showing its usable value. As a result, it may have influence on the social and economic plane of the region. The maintenance of appropriate exposure of a historic park is the condition for protection of its value. Appropriate exposure is perceived as an element of anchorage of the estate in the spatial and cultural structure of the place. It is also a form of protection of broader landscape, which is composed of the relations between the historic park or garden and other landscaping elements, including contemporary estates. As a carrier of identity of the place a historic park or garden is an element uniting the local community and emphasising its common cultural roots (Cieślak, 2008). The absence of uniform valuation criteria and uniform rules of protection, which would rationalise the decisions of authorities, intensifies the element of discretion and contingency. The development of a system of valorisation of all categories of monuments, including cultural landscape,

is a key issue for the effective functioning of conservation services (Fuglewicz, 2013). It is also noteworthy that rapid changes related with civilisation undermined the sense of the whole philosophy of cultural heritage protection and conservation (Lewicki, 2011). The main goal of the study was to create a universal, tabular method of valorisation of the state of preservation of historic green space establishments arranged in different styles and near different types of residences. The table included the following elements of assessment:
• the state of preservation of historic elements of the spatial arrangement,
• the value of the historic spatial arrangement,
• the cultural value with potential tourist values,
• the natural and ecological importance of the estate assessed,
• the dangers and their influence on the estate under investigation.

The aim of the study was also to draw the attention of the users of historic green space estates to the high value of historic gardens to the cultural landscape and to the regional and national identity.

Materials and Methods

Study site

Between 2011 and 2013 - 14 historic garden estates in different states of preservation were the subject of research. All of them are located in Greater Poland Region in western Poland (Figure 1).
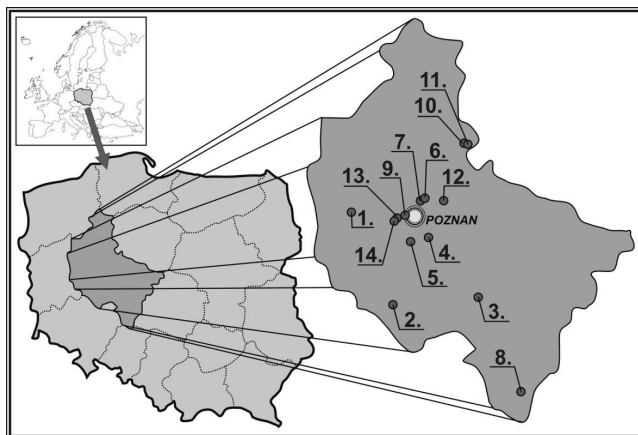

Fig. 1. The location of park and garden complexes in Greater Poland Region
(1 – Posadowo; 2 – Rydzyna; 3 – Dobrzyca; 4 – Kornik; 5 – Rogalin; 6 – Owinska; 7 – Radojewo; 8 – Siemianice; 9 – Edwardowo; 10 – Podolin; 11 – Srebrna Gora; 12 – Kocialkowa Gorka; 13 – Dabrowka; 14 – Konarzewo)

COMPARISON OF SELECTED HISTORIC ESTATES	**1**	**2**	**3**	**4**	**5**	**6**	**7**
NAME OF ESTATE:	POSADOWO	RYDZYNA	DOBRZYCA	KORNIK	ROGALIN	OWINSKA	RADOJEWO
TYPE OF GREEN SPACE ARRANGEMENT:	PARK/GARDEN	GARDEN	PARK/GARDEN	PARK/GARDEN	PARK/GARDEN	PARK	PARK
TYPE OF PARK/ GARDEN:	PALATIAL	CASTLE	PALATIAL	CASTLE	PALATIAL	PALATIAL	PALATIAL
FORM OF STYLE:	GEOMETRICAL AND SCENIC	GEOMETRICAL AND SCENIC	SCENIC	GEOMETRICAL AND SCENIC	GEOMETRICAL GEOMETRICAL AND SCENIC	SCENIC	SCENIC
DATE OF ESTABLISHMENT:	18TH CENTURY	17TH CENTURY	19TH CENTURY	17TH CENTURY	18TH CENTURY	1ST HALF OF 19TH CENTURY	19TH CENTURY
AREA:	10.6 ha	6.9 ha	9.2 ha	40 ha	7.3 ha	21.6 ha	15 ha

COMPARISON OF SELECTED HISTORIC ESTATES	**8**	**9**	**10**	**11**	**12**	**13**	**14**
NAME OF ESTATE:	SIEMIANICE	EDWARDOWO	PODOLIN	SREBRNA GORA	KOCIALKOWA GORKA	DABROWKA	KONARZEWO
TYPE OF GREEN SPACE ARRANGEMENT:	PARK	PARK	PARK	PARK	PARK	PARK	PARK/GARDEN
TYPE OF PARK/ GARDEN:	PALATIAL	VILLA	MANORIAL	PALATIAL	PALATIAL / MANORIAL	PALATIAL / MANORIAL	PALATIAL
FORM OF STYLE:	SCENIC	SCENIC	SCENIC	SCENIC	SCENIC	SCENIC	GEOMETRICAL AND SCENIC
DATE OF ESTABLISHMENT:	19TH CENTURY	2ND HALF OF 19TH CENTURY	19TH CENTURY	19TH CENTURY	19TH CENTURY	19TH CENTURY	18TH CENTURY
AREA:	4.5 ha	3 ha	3.5 ha	16 ha	3 ha	15 ha	13 ha

Fig. 2. A comparison of the estates

The following establishments were researched: one villa estate, two manorial estates, nine palatial estates and two castle estates (Figure 2).

Methods

Among different research methods applied in the process of revalorisation of historic gardens some have evaluative character or include the elements of valorisation. Such methods as historical analysis, dendrochronological analysis and spatial composition analysis only partially differentiate the value of spatial elements in a historic garden (Majdecki, 1993). The methods differentiate between historic and contemporary elements and they simultaneously evaluate them. Research on gardens also applies field methods, i.e. dendrological inventory, dendrochronological inventory, and study analyses, i.e. historical analysis, archive analysis, historical section analysis as well as the analyses of spatial composition and scenic connections (Kaupp, 2003; Majdecki, 1993). For example, thanks to dendrology, investigations into the age and species structure of trees (which make the main historic substance) give a possibility to obtain a clear differentiation of the structures belonging to the historic composition. The aforementioned methods prove to be effective in the process of revalorisation of an estate, but they do not enable a complex approach to the historic garden estate. The elements of the composition which are studied by means of those methods are considered with respect to the entire arrangement. It is difficult to compare the results, because usually they have a descriptive character and some data can be compared by means of percentage.

The method of analysis and valorisation of historic values in historic green space arrangements, which was applied in this study, was based on an extensive evaluation table where specific numerical data can easily be processed in statistical analyses. Thus, it is relatively easy to analyse and measure the comparisons of values of particular estates. Apart from that, the suggested method was developed for field work, right in the estate area. As a result, there is an authoritative analysis of the current condition of a historic garden and thus, there are precise results.

The table which is the basis of the method in question was divided into four main sections. The first section of the table (Figure 3) includes the basic criteria characterising the type of green space arrangement, the type of park or garden, its stylistic form and the date of origin and area.

The second section of the comparison includes general administrative and proprietary data concerning the estate (Figure 3).

The third and most important section of the table includes the assessment of the state of preservation, valuation and significance of individual elements of the establishment for the entire composition. Apart from that, this section of the table includes the identification and valorisation of dangers to the estate (Figures 4 and 5).

This section of the table consists of segments 3A, 3B and 3C. Segment 3A, which includes historic values, contains

Fig. 3. The first and second section of the valorisation table containing general data about the estate

Fig. 4. The third section of the table includes a valorisation analysis of the state of preservation of historic elements of the spatial arrangement, its historic and cultural values as well as its natural and ecological significance

Fig. 5. The fourth section of the table includes types of dangers and their influence on the historic estate

three subgroups of criteria related with the determination of the degree of preservation of historic elements of the spatial arrangement, the historic value of the spatial arrangement and its cultural value in view of potential tourist values (including the relations between the green space arrangement and other historic elements as well as the relations with historical events and figures). Segment 3B includes a valorisation of natural and ecological values of the historic establishment under study.

Segment 3C includes an analysis of the factors which may cause danger to the estate valorised. This section of the table presents the types of danger and their influence on the historic establishment under study (Figure 5).

The type of dangers should be characterised in the remarks section. The maximum number of points to be scored for the degree of dangers and their impact is 25. The factors indicated in this section of the table may be used as information for statistical analyses. The final score (Tv) should be written at the bottom of the table. The method presents the historic value of each estate under study according to the following formula:

$$Tv = 3A + 3B - 3C$$

Tv – total value of estate; *3A* – historic values; *3B* – natural and ecological values; *3C* – dangers.

As a result, it is possible to obtain a numerical result, which is easy to compare and interpret. Apart from that, this section of the analysis also includes extra boxes for short remarks, such as brief descriptions or characterizations of the element. The data may be very useful for further, more detailed analyses.

Section 4 of the table, which is on the reverse side of the sheet, is meant for a schematic drawing of a general plan of the historic estate valorised. Outstanding elements of the spatial composition, composition axes and scenic connections valuated in the main table (Section 3A) can be colour-marked in a simplified drawing. Apart from that, it is also necessary to mark the location and the zone of influence of the dangers in the direct neighborhood of the area under study.

The following division and criteria have been adopted in the final classification of historic estates:
• 0-20 points – an estate of very strongly degraded values:
   - strongly or completely ruined garden or park estate,
   - absence or fragmentary, individual elements of composition,
   - recommended actions – conservation by documentation;
• 21-40 points – an estate of degraded values:
   - strongly ruined garden or park estate,
   - legible fragmentary elements of composition,

   - recommended actions – immediate, full revalorisation;
• 41-60 points – an estate near degradation, with values preserved:
   - garden or park estate in sufficient state of preservation,
   - legible elements of structure and legibility of entire composition,
   - recommended actions – revalorisation;
• 61-80 points – an estate with values preserved:
   - well preserved garden or park estate,
   - legible composition,
   - recommended actions – conservation and partial revalorisation;
• 81-100 points – an estate with very high values preserved:
   - very well preserved garden or park estate,
   - perfectly legible composition,
   - recommended actions – preventive conservation

Statistical methods

Statistical analyses and models were based on discriminant analysis. The analysis resulted in checking which variables may have influence on the values of historic green space arrangements. Canonical variate analysis (CVA), which is a variant of Fisher's linear discriminant analysis (LDA) was used to construct the model (Lepš and Šmilauer, 2003).

The discriminant analysis compared the influence of different variables (criteria) on the historic values in green space arrangements in parks and gardens in Greater Poland. The analysis included the following parameters: the type of park/garden, stylistic form and the degree of processing of the elements of the old spatial arrangement (composition axes, road system, historic stand of trees, legible plant arrangements, elements of the water system, elements of landform, residential architecture, garden architecture, farmhouse architecture, scenic connections and openings), the value of the spatial arrangement (the homogeneity of style in the entire arrangement, the historic value of the arrangement, the value of items of residential architecture, the value of items of farmhouse architecture, scenic and aesthetic values, representativeness or uniqueness on a regional scale, the relationship between the estate and historical figures or events), natural and ecological values (rare species of trees and bushes, the trees which are natural monuments, tree density, the state of health of the tree stand, ecological significance) and dangers and their influence (agriculture, industry, transportation, urbanisation, destruction).

In order to find out which variables have the greatest impact on the assessment of historic values of green space arrangements in parks and gardens the following step analysis was applied. All variables were assessed. The model included

the variables which most contributed to the discrimination of groups on the basis of p and F values for the variable under analysis. The process was repeated until the moment when p value was greater than 0.05 for the variable under analysis.

In order to determine the limit level of significance a Monte Carlo permutation test was made (individually for each variable and then for the whole model). All comparisons, calculations and graphic elements were made by means of Canoco for Windows and Microsoft Excel spreadsheet. The following tools of Canoco for Windows were used: Canoco for Windows 4.5, CanoDraw for Windows and WCanoIMP.

Results

Figure 6 shows the palace and park complex in Dabrowka. The valorisation of the estate was illustrated with the table for analysis and valorisation of historic values in green space arrangements presented in the study.

As a result of the work and completion of the valorisation table the palace and park complex in Dabrowka scored 51 out of 100 points, having subtracted the score in section 3C. The

score classifies the estate in Dabrowka as almost degraded with its values preserved. As a result of the study, it is recommended that the estate should be revalorised completely.

Figure 7 shows the collective results of analyses and valorisations of 14 historic green space estates and the valorisation criteria of values in historic green space arrangements. The analysis revealed that estate No. 4 (the castle and park complex in Kornik) was characterised by the highest degree of preservation. The high note it received resulted from high historic, natural and ecological values of the estate under study and from the minimal danger and its influence on the estate. Estate No. 9 (the villa and park complex in Edwardowo) received the lowest note, as it scored only 35 points (out of 100) when its values were assessed. Apart from that, the estate was the most exposed to dangers and their influence. Figure 7 shows detailed results.

The tables for each estate were individually filled during field work. The data with points scored were used as material for further evaluative statistical analyses. The model on Figure 8 describes dependences between the estates under study and the variables under analysis (criteria).

Fig. 6. An example of a table for the palace and park complex in Dabrowka

COMPARISON OF SCORES FOR HISTORIC ESTATES	1	2	3	4	5	6	7
NAME OF ESTATE:	POSADOWO	RYDZYNA	DOBRZYCA	KORNIK	ROGALIN	OWINSKA	RADOJEWO
TOTAL SCORE OF HISTORIC, NATURAL AND ECOLOGICAL VALUES	72	63	85	87	78	55	46
DANGERS AND THEIR INFLUENCE	9	13	6	3	9	11	12
FINAL SCORE	63	50	79	84	69	44	34

COMPARISON OF SCORES FOR HISTORIC ESTATES	8	9	10	11	12	13	14
NAME OF ESTATE:	SIEMIANICE	EDWARDOWO	PODOLIN	SREBRNA GORA	KOCIALKOWA GORKA	DABROWKA	KONARZEWO
TOTAL SCORE OF HISTORIC, NATURAL AND ECOLOGICAL VALUES	60	35	43	60	32	66	57
DANGERS AND THEIR INFLUENCE	6	16	13	9	11	15	13
FINAL SCORE	54	19	32	51	22	51	44

FINAL SCORE (Tv = 3A + 3B - 3C)	VALUES OF HISTORIC GREEN SPACE ARRANGEMENTS - VALORISATION CRITERIA	41 - 60	ESTATE NEAR DEGRADATION, WITH VALUES PRESERVED
0 - 20	ESTATE OF VERY STRONGLY DEGRADED VALUES	61 - 80	ESTATE OF VERY STRONGLY DEGRADED VALUES
21 - 40	ESTATE OF DEGRADED VALUES	81 - 100	ESTATE OF DEGRADED VALUES

Fig. 7. A comparison of all the estates, their scores and assessment criteria

As far as such variables as regular spatial arrangements, residential architecture, landform elements and legible plant arrangements are concerned; Rogalin (5) was the best preserved estate. The best preserved road system could be found in Kornik (4), whereas the state of preservation of the farmhouse architecture was the best in Edwardowo (9) and Dabrowka (13) (Figure 9).

As far as the variables under analysis are concerned, the state of preservation was the worst in Edwardowo (9), Podolin (10), Kocialkowa Gorka (12) and Konarzewo (14). The effect observed was only inversely proportional to the variables included in the model. In all of the manorial and villa parks the farmhouse architecture was in good state; in palace parks the garden architecture was the best preserved, whereas in castle parks there were legible plant arrangements.

In many of the estates under study low values of the spatial arrangement were noted. Usually this applied to the manorial and villa estates and those with a scenic stylistic form.

As far as the value of the spatial arrangement is concerned, the state of preservation was the best in Kornik (4) – the highest positive correlation. The park under study was characterised by the greatest historic value and stylistic homogeneity of the whole arrangement. The castle estates were characterised by the greatest uniqueness on a national scale. As far as the variables under analysis are concerned, the estates in Podolin (10), Kocialkowa Gorka (12) and Edwardowo (9) scored the lowest.

In many of the historic establishments under study the natural and ecological values also proved to be their weak point (Figure 10).

As far as these variables are concerned, the estates in Edwardowo (9), Podolin (10), Srebrna Gora (11) and Owinska (6) proved to be the worst. In Kornik (4) the largest number of rare tree and bush species was found and there was the greatest tree density, whereas in Rogalin (5) there was the greatest number of trees which were natural monuments. In general, the parks with a geometrical and scenic stylistic form were characterised by the best natural and ecological values.

The last model (Figure 11) includes the variables which may have negative influence on the estates under investigation. The highest degree of users' destructive activity was observed in Edwardowo (9), Podolin (10), Kocialkowa Gor-

ka (12) and Dabrowka (13). The negative influence of industry and agriculture was greatest in Podolin (10), whereas in Rogalin (5) and Radojewo (7) an uncontrolled development of built-up areas was observed. The lowest danger caused by
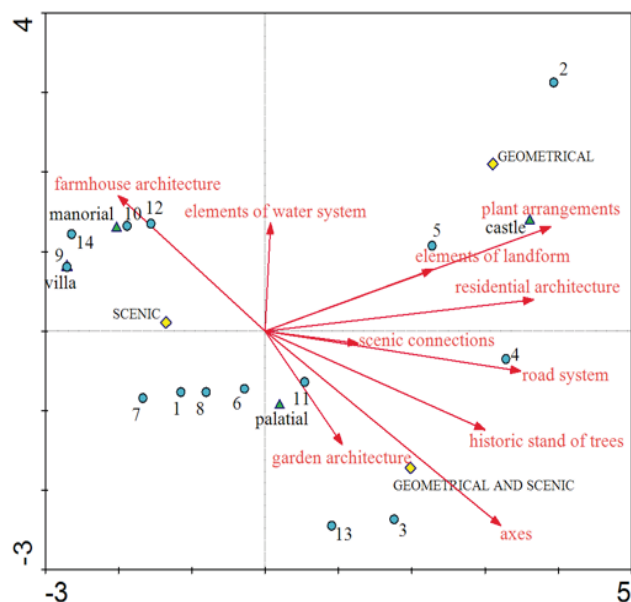
Fig. 8. A CVA model (n=42) – the dependences between the estates under study and the degree of preservation of historic elements of the spatial arrangement (p<0.05)

Fig. 10. A CVA model (n=42) – the dependences between the estates under study and the natural and ecological values (p<0.05)

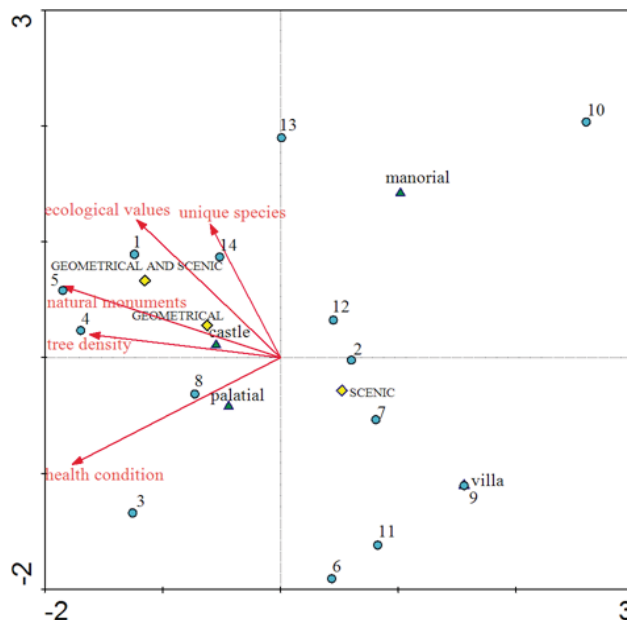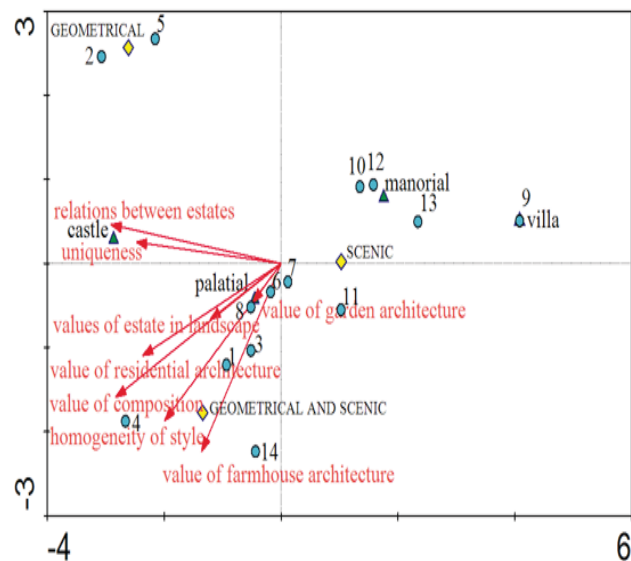**Fig. 9.** A CVA model (n=42) – the dependences between the estates under study and the values of the historic spatial arrangement (p<0.05)
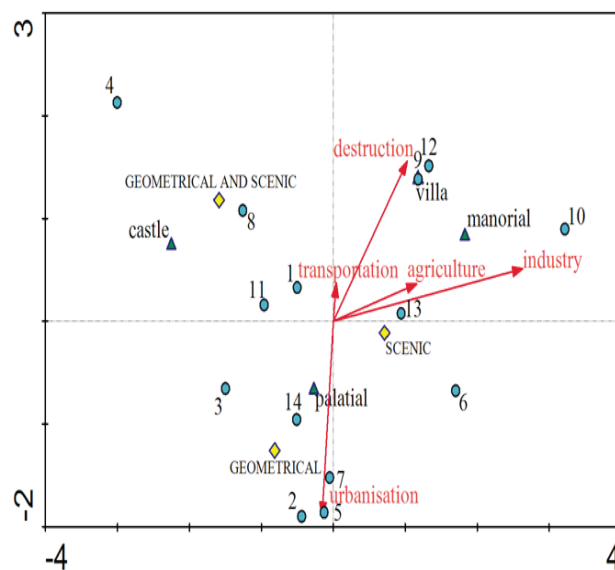

Fig. 11. A CVA model (n=42) – the dependences between the estates under study and the dangers and their influence (p<0.05)

the anthropogenic activity was observed in the castle estates, especially in Kornik (4).

The results of the analyses and valorisations of historic values in the historic green space arrangements were confirmed by the statistical models.

Discussion

Among the large number of unreviewed publications on the valorisation and assessment of the values of historic green space arrangements only a few publications discuss new methods of valorisation of historic estates or adapt the existing ones.

According to Mitkowska (2012), the aim of valuation of gardens should be to obtain objective assessment of these areas. The assessment should help one formulate optimal recommendations for conservation of a particular estate. The author notes that it is often necessary to formulate an original method, which corresponds to the characteristic motifs and elements of a historic composition (Mitkowska, 2012). Cieślak (2008) also notes that it is necessary to develop a method which would enable full diagnosis of the status quo and future threats to a historic estate. According to the author, the current legal regulations concerning the protection of historic estates and items of cultural heritage in Poland are not equivalent to their real protection (Cieślak, 2008). Appropriate valorisation would enable separation of the most valuable historic estates (which should be given unconditional and complex protection) from those which could receive lesser or different protection. However, it should always be necessary to specify the object of protection and the values which should remain inviolable (Lewicki, 2011).

The descriptive questionnaire method must be considered as absolutely insufficient due to the fact that it is based on the analysis of one of the elements of a historic green space arrangement, even though the element might be very important, e.g. an architectural item which is part of the garden estate (Doratli et al., 2004; İpekoğlu, 2006; Yildirim, 2012). A valuable methodology of detailed analysis of the composition of historic garden estates was presented in a study describing selected greatest renaissance and baroque estates as well as scenic gardens, but there is no valuation of those estates (Steenbergen, 2003). Halbrooks provides an elaborate description of the revalorisation of Stan Hywet Hall and Gardens in Akron (Ohio) in her study. However, the method she suggests is descriptive, so it is difficult to use it for comparisons and statistical analyses and it does not give measurable results (Halbrooks, 2005). The restoration works on Barnsley Gardens (Georgia) were described in the same way, which is difficult to compare and analyse (Nestor and Mann, 1998). A similar methodology of revalori-

sation works was proposed by Italian authors in their design of the revalorisation of a strongly transformed nineteenth century garden establishment in Imola (Italy) (Tassinari et al., 2010). A more interesting and more complete methodology of valorisation of historic green space establishments was applied in an analysis of the gardens designed by André Le Nôtre. The authors took the elements of the composition into consideration and they also included the stylistic traits and transformations over centuries. The results of the study were presented in a table, but still they were descriptive. Thus, it is difficult to compare the results with each other and with other estates and it is impossible to compare the results in statistical analyses (van den Toorn, 2010).

Due to the difficulties with interpretation and the impossibility to make a comparative and statistical analysis with descriptive methods of valorisation of historic estates, it seems to be necessary to develop a tabular method of presentation of valuation of a historic estate by means of numerical values, which can easily be interpreted and used in statistical comparisons (Mitkowska, 2012). Polish authors attempted to develop a simple and easy table estimating the value of mobile monuments. They proved that the use of a point scale to assess the state of preservation of valorised items simultaneously enabled the formulation of guidelines, indicating the priorities in conservation and restoration works (Gogolin and Arszyńska, 2012).

One of the aims of the investigations was to increase the awareness of professionals involved in the revalorisation and conservation of historic garden establishments and to draw the attention of the users of those estates (both residents and politicians) to the high value of historic garden establishments to the cultural landscape and regional and national identity. The investigations and their results should help specialists with the revalorisation of architectural and garden establishments. At the time of progressing globalisation they should be appreciated as they are monuments of horticultural art of past generations.

Conclusions

- The development of the method of analysis and valorisation of historic green space arrangements proved to be particularly useful both in field work and in study work related with the preliminary stage of revalorisation of historic green space arrangements.
- The valuation and statistical analyses led to the following findings:
    - Only one (the castle and park complex in Kornik) out of fourteen estates under investigation can be classified as an estate with very high values preserved. The recommended conservation activity should be preventive conservation;

- 3 out of 14 estates were in the group of estates with preserved values included in the table. They should undergo conservation and partial revalorisation;

- 6 out of 14 estates were nearly degraded, but they preserved the values under analysis. The estates should be revalorised;

- 3 out of 14 estates were in the group of estates with degraded values. They should undergo full revalorisation immediately;

- Only one estate (the villa and park complex in Edwardowo) out of fourteen was classified as an estate whose values were very strongly degraded. It should undergo conservation by documentation.

• The method may be interpolated and used in complex revalorisation and conservation works on historic green space arrangements not only in Poland but also in Europe.

References

Cieślak, A., 2008. The problems of cultural heritage protection in spatial planning. Possibilities, insufficiencies, needs and tendencies. In: B. Szmygin (Ed.), Modern Problems of Conservation Theory. Warszawa-Lublin, Międzynarodowa Rada Ochrony Zabytków ICOMOS, *Politechnika Lubelska*, pp. 25-33.

Doratli, N., S. O. Hoskara and M. Fasli, 2004. An analytical methodology for revitalization strategies in historic urban quarters: a case study of the Walled City of Nicosia, North Cyprus. *Cities*, **21** (4): 329-348. doi:10.1016/j. cities.2004.04.009

Fuglewicz, S., 2013. Why we protect cultural heritage? In: B. Szmygin (Ed.), Process of Valuation Used in Protection and Conservation of Cultural Heritage Objects and Sites. Warszawa, Polski Komitet Narodowy ICOMOS, *Muzeum Palac w Wilanowie*, pp. 77-86.

Gogolin, M. R. and J. Arszynska, 2012. An attempt of mathematical validation of cultural heritage objects). In: B. Szmygin (Ed.), Process of Valuation Used in Protection and Conservation of Cultural Heritage Objects and Sites. Warszawa - Lublin: Polski Komitet Narodowy ICOMOS, Biuro Stołecznego Konserwatora Zabytków Urzędu Miasta Stołecznego Warszawa, *Politechnika Lubelska*, Fundacja Politechniki Lubelskiej, pp. 45-56.

Halbrooks, M. C., 2005. The English Garden at Stan Hywet Hall and Gardens: interpretation, analysis, and documentation of a historic garden restoration. *HortTechnology*, **15** (2): 196-213.

ICOMOS-IFLA, 1981. The *ICOMOS-IFLA* International Charter for Historic Gardens.

Ignatieva, M. and G. Konechnaya, 2004. Floristic investigations of historical parks in St. Petersburg, Russia. *Urban Habitats*, **2** (1): 174-216.

İpekoğlu, B., 2006. An architectural evaluation method for conservation of traditional dwellings. *Building and Environment*, **41** (3): 386-394. doi:10.1016/j.buildenv.2005.02.009

Kaupp, J., 2003. The park maintenance plan landscape park Klein-Glienicke as a modern instrument for the preservation of historic gardens. In: 25 Years of Conservation of the Historic Parks in Klein-Glienicke. A Rediscovered Garden of Eden, Berlin, *Landesdenkmalamt Berlin*, pp. 18-22.

Kümmerling, M. and N. Müller, 2012. The relationship between landscape design style and the conservation value of parks: a case study of historical park in Weimar, Germany. *Landscape and Urban Planning*, **107** (2012): 111-117. doi:10.1016/j. landurbplan.2012.05.006

Lepš, J. and P. Šmilauer, 2003. Multivariate Analysis of Ecological Data using CANOCO. Cambridge, *Cambridge University Press*.

Lewicki, J., 2011. Valorisation and conservation. An efficient approach to protection of cultural heritage in Poland. In: B. Szmygin (Ed.), Cultural Heritage Protection System in Poland. Analysis, Diagnosis, Propositions. Lublin – Warszawa: Polski Komitet Narodowy ICOMOS, Biuro Stołecznego Konserwatora Zabytków Urzędu Miasta Stołecznego Warszawa, *Politechnika Lubelska*, pp. 171-182.

Majdecki, L., 1993. Protection and conservation of historic green space arrangements. Warszawa: *Wydawnictwo Naukowe PWN.*

Mitkowska, A., 2012. The thoughts on historic green space arrangements valuation for their protection and conservation. In: B. Szmygin (Ed.), Process of Valuation Used in Protection and Conservation of Cultural Heritage Objects and Sites. Warszawa – Lublin, Polski Komitet Narodowy ICOMOS, Biuro Stołecznego Konserwatora Zabytków Urzędu Miasta Stołecznego Warszawa, Politechnika Lubelska, *Fundacja Politechniki Lubelskiej*: pp. 121-133.

Nestor, B. A. and W. A. Mann, 1998. An archival restoration of the horticultural and design elements of Barnsley Gardens, Georgia. *Landscape and Urban Planning*, **42** (2-4): 107-122. doi:10.1016/S0169-2046(98)00081-4

Säumel, I., I. Kowarik and S. Butenschön, 2010. Green traces from past to future: the interplay of culture and ecological processes in european historical parks. *Acta Hort. (ISHS)*, **881**: 933-938.

Steenbergen, C. M., 2003. Architecture and Landscape: The Design Experiment of the Great European Gardens and Landscapes. Basel, Boston, *Birkhäuser*.

Tassinari, P., I. Diti, D. Torreggiani and S. Benni, 2010. Reconstruction of the historic image of an urban garden as a tool for preservation and enhancement. *Acta Hort. (ISHS)*, **881**: 1035-1038.

Van den Toorn, M., 2010. Plants as design material in gardens of Le Notre. *Acta Hort. (ISHS)*, **881**: 909-920.

Yildirim, M., 2012. Assessment of the decision-making process for re-use of a historical asset: The example of Diyarbakir Hasan Pasha Khan, Turkey. *Journal of Cultural Heritage*, **13** (4): 379-388. doi:10.1016/j.culher.2012.01.018