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CHANGES OF LANDSCAPE STRUCTURE AND CULTURAL VALUES OF VINEYARD LANDSCAPE

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Abstract

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The aim of this paper is to assess the structural changes development of vineyard type of cultural agriculture landscape in Čajkov cadastre. In landscape space out of built up rural settlement Čajkov the vineyards create a specific landscape segment which covers 6% of the whole cadastre area. Two time development periods are compared, i.e. 1896s and 2010s, or 2011s with emphasis to land use form changes and area size changes of vineyard parcels. The result shows that vineyards represent more than 100 hundred years continuity of historical valuable cultural landscape which was not influenced by agricultural collectivisation processes within the second part of the 20th century. The second part of the paper is aimed to assess cultural value of the vineyards by using 9 different criteria such as: age of vineyards, area plots and mosaic structures, archaic vine technology, anthropogenic relief, old vineyard's buildings and sacral architectural elements, old large and rare fruit trees, traditional and local vine sorts, archaeological locality and finds. Assessed vineyards landscape of Čajkov cadastre is unique, has well preserved historical continuity in landscape structure and a high cultural and historic value.

vinicultural landscape, structural changes, cultural values

The wine as a cultural plant (*Vitis vinifera* L., subspecies sativa) has been cultivated on the territory of Slovakia already by the Celtic population (400–500 B.C.), in the Slovak period from the time of Great Moravia (9th century A.D.) until present day (Libant, 2009). According to historical documents and statistical databases the largest vineyard areas on the Slovak territory were recorded in 1720 at 57,000 ha. Since then area development of vineyards has had the following trends: 1870 – 40,000 ha, 1920 – 8,800 ha, 1937– 14,700 ha, 1945 – 1,200 ha, 1956 – 15,000 ha, 1978 – 32,000 ha, 1999 – 26,000 ha, 2008 – 21,477 ha. A significant reduction in vineyard areas at the turn of 19th and 20th centuries was caused by phyloxera attack (*Phylloxera vastatrix*) and in the time period 1990 to 2002 by structural changes in the Slovak agriculture (Farkaš, 2002; Supuka, Verešová and Šinka, 2011). Nowadays (2012) almost 18,000 ha of vineyards in Slovakia are actively managed in 6 vineyards regions, 40 zones and 624 cadastre territories. The European Commission has approved vineyard planting rights of 22,227 ha for Slovakia (Farkaš, 2012; Verešová, 2011).

Cultural vineyard landscape is a subcategory of agriculture cultural landscape. Both experienced structural changes in the course of history. Historical maps and especially aerial photos (of Slovakia from 1946) show that vineyard landscape has had mosaic small area structure in the past. Rare fruit trees, old vineyard houses, cellars and purpose constructions, distribution of small sacral architecture were typical representatives. Moreover marks of anthropogenic relief (terraces, stone walls and other) were visible especially on the steep slopes. Those features represent today already rare historical landscape structures with traditional forms of vine growing.

On the other hand the later growing technologies, ownership relation changes and overall intensification processes caused distinctive landscape structure changes in the recent times including vineyard cultural landscape. Mosaic structures of the small-scale plots in many cases

converted to large-scale plots. A lot of localities and landscape segments have lost typical features of the historical landscape structure and traditional (archaic) growing technologies (Babicová and Gerhátová, 2011; Špulerová *et al*., 2011). But the vineyards especially on slopes and less fertile soils have not changed their growing technology and have not gone through collectivisation processes and changes of large area plots.

For already a long time the vineyards have formed landscape structure when their area portion in typical vineyard regions have achieved different proportionality level in the frame of a cadastral territory, e.g. Sv. Jur cadastre – 29% portion (Štefunková and Cebecauer, 2006), Hosťová, Pohranice, Štitáre cadastres – from 6 to 14% (Pucherová, 2004), Nitrianske Hrnčiarovce cadastre – 11.8% (Supuka, Verešová and Šinka, 2011).

Viticultural landscape by its area and inner structure represents a specific landscape image phenomenon and a visually perceived element. It contains features and characteristics of cultural, historic and aesthetic values. Many features are dynamic and progressively changeable, but vineyard as a spatial element of landscape has also had important historical values in its continual changes (Antrop and Van Eetvelde, 2000; Huba, 2000). Vineyards are representative landscape elements in many regions and geographical units not only in Slovakia but also abroad. In a reference to a historical document, Janota (1968) has suggested, that the Malé Karpaty territory near Bratislava capital should be declared a protected study area, because it has a specific type of the viticulture landscape and a vine has been cultivated there since 270 B.C.

Historically documented and currently actively managed vineyard landscape segments are lively spaces for agrotourism development where so called wine routes or king ones are being established. Those have cultural, aesthetic, educational, gastronomy, wine tasting and recreation services and are popular abroad and in Slovakia as well (Otepka and Habán, 2007).

The aim of this contribution is to assess the development aspect of the cultural vineyard landscape of Čajkov cadastre with an emphasis to structure changes in the compared periods and to cultural and historical values.

The first written historical records about the Čajkov village were identified in 1279, but it is believed to have existed before 1241. The village was a property of the Saint Benedictine monastery, later Tekov province (zhupah). Vine growing tradition dates back to this period that has important and continual influence at forming of cultural vineyard landscape. Wine production has had economy and market profitability. Along with vine growing and wine production traditional culture, specific folk wear, fine art, hand crafts, and traditional vine harvesting festival have been developed. The specific folk architecture of rural family houses and vineyard cellars and sacral architecture elements were found in the studied area. Čajkov´s vineyards belong to Nitra king vine route (Muráni, 2006). Those cultural and historical values, vineyard traditions and technologies were the reason why this region was chosen for the study.

MATERIALS AND METHODS

Characteristics of the study area

Nature conditions are elaborated by using two basic published sources (Miklós, Hrnčiarová *et al*., 2002; Muráni, 2006). Čajkov cadastre is located on the southern slopes of the western part of Štiavnické vrchy Mts at the elevation of 190 to 747 m.a.s.l. From the phytogeography point of view the territory belongs to the Western Carpathian (*carpaticum occidentale*) flora domain. The dominant plant communities are oak-hornbeam Carpathian forests. Natural vegetation formations are markedly changed by the agricultural land use form including vine growing. The territory belongs to warm and moderately warm climate region with an average annual temperature 9.5 °C and 600 to 680 mm precipitation. Čajkov cadastre is a part of the Štiavnické vrchy Mts. Protected Landscape Area where 10 localities of NATURA 2000 are delineated. The climate and the bedrock (e.g. volcanic andesine, tuff rock) create excellent conditions for vine growing as well, which has historical roots and traditions there since the 13th century.

The aims and contents of evaluation

The aim of the paper is to assess the secondary landscape structure of the cadastre territory with an emphasis on the vineyard landscape segment. Changes of area structure vineyards are compared between 1896 and 2010 and/or 1896 and 2011 as a result of social economy activities, intensification processes in agriculture, vine growing technologies and vineyard plots ownership.

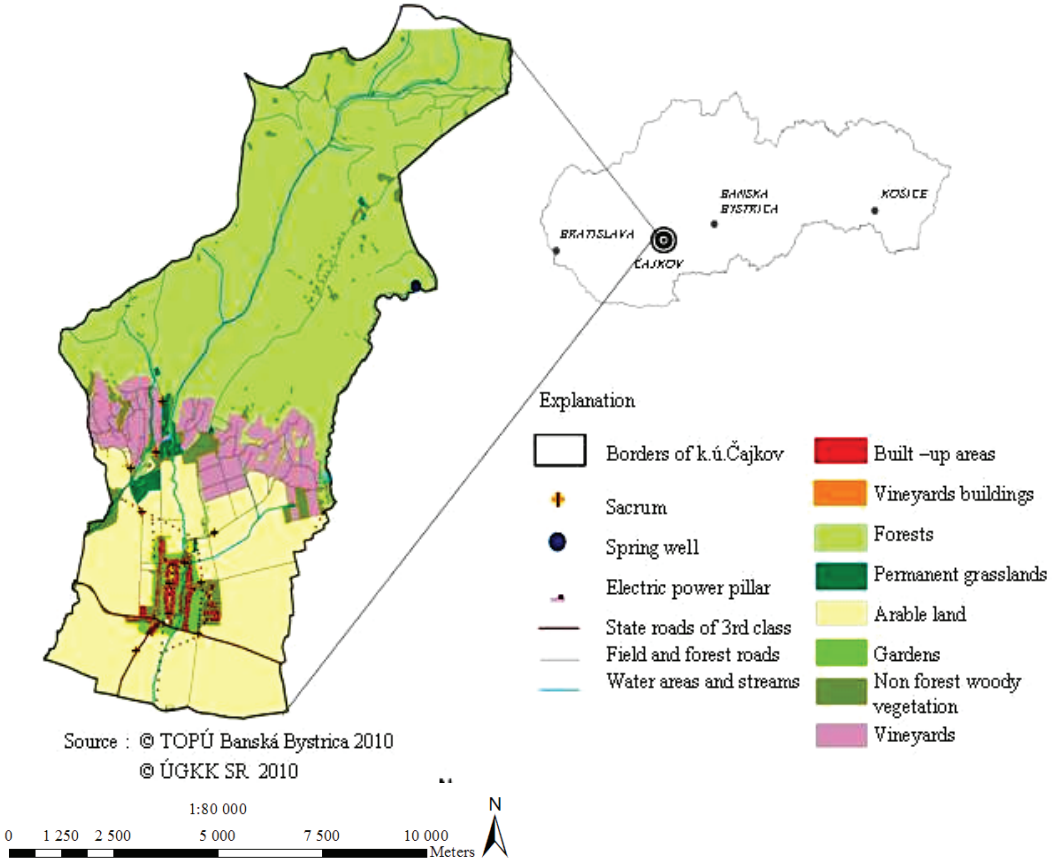
In the second part of the contribution the vineyard parcels are expressed in 5 area size categories for the purpose of structural and mosaic marks identification at vineyard cultural landscape. Cultural historical values of vineyards are assessed according to the following occurred marks: age of vineyard plots over 100 years, area plot under 0.5 ha predominantly, archaic cultivation technologies, anthropogenic formed relief, historical wine house architecture, elements of sacral architecture, old and regional vine sorts and cultivars, rare and traditional fruit trees, archaeological locality and findings by the method of Supuka, Verešová (2012). Those features were collected in questionnaires disseminated to 145 vineyard plot owners chosen randomly to have all vineyards areas generally covered. The historical landscape structures of 1896 were taken from the land register map sheets provided by the Institute of Geodesy and Cartography in Bratislava. The contemporary landscape structure of 2010 was taken from the vectorised cadastral map provided

by the Cadastre Administration in Levice. The dates were converted to GIS media and the parcel areas were determined through classification of 5 area sizes (Supuka, Verešová and Šinka, 2011).

RESULTS

Contemporary landscape structure of the cadastre territory and area space characteristics of the assessed vineyards

The contemporary landscape structure represents nature potential and land use forms (Fig. 1). The results of area inventory according to landscape element are shown in Tab. I. The largest part of all the cadastre area of 2,394.52 ha is covered by forests at its northern part as the segment of Štiavnické vrchy Mts. and amounts to 55.5%. From the south border of the forests the middle part takes over vineyard landscape segment at moderate slopes and variable relief in the course from the north to the south and covers 6% of all cadastre area. Arable land follows as the next landscape segment on the south and takes up 30% on the deeper and more fertile soils. Permanent grasslands are located between vineyard and arable land plots but in



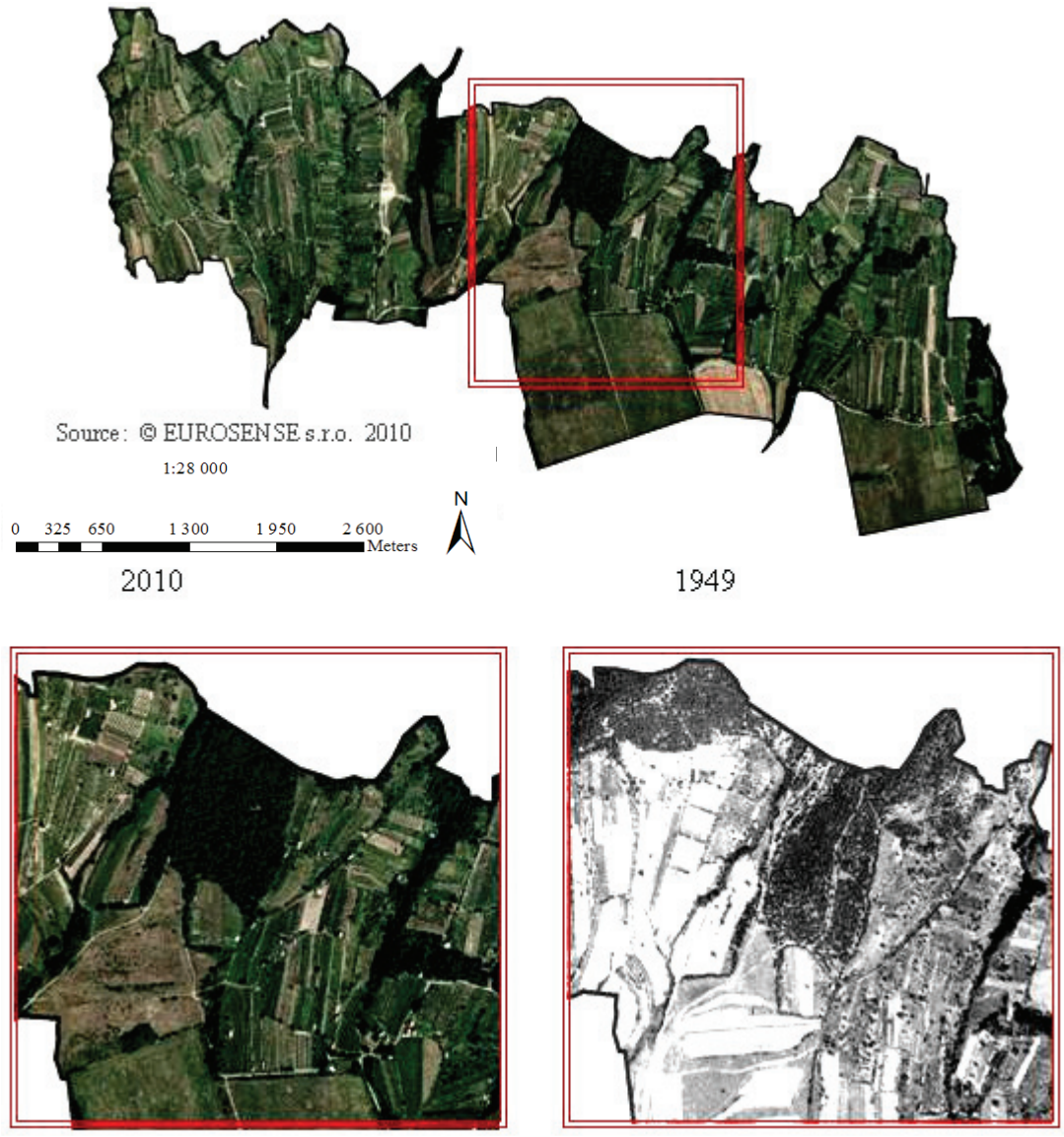
1: *The current landscape structure of the Čajkov cadastre (author: M. Verešová)*

I: *Secondary landscape structure of the Čajkov cadastre, 2010*

Landscape elements	Area (ha)	Percentage (%)
Roads	8.52	0.35
Water	16.00	0.60
Other areas	37.00	1.52
Arable land	720.00	30.00
Non-forest woody vegetation	14.10	0.60
Built-up areas	57.40	2.40
Grassland	65.00	2.80
Forests	1,334.00	55.50
Vineyards	138.00	6.00
Total	2,394.52	100.00

II: *Area of the vineyard parcels according to size categories*

Category	Area (m²)	Number of parcels	Area parcels together (ha)	Percentage (%)
1	< 500	232	7.037	5.08
2	500–1,000	331	24.755	17.87
3	1,000–5,000	345	61.067	44.10
4	5,000–10,000	5	3.366	2.43
5	> 10,000	2	42.287	30.52
Total		915	138.512	100.00



2: *Landscape structure changes of the vineyard segments within compared time periods of 1949 and 2010 (author: M. Verešová)*

a lesser share of 2.8%. Built-up area is represented by the Čajkov village and covers 2.4% of the cadastre area. The settlement is predominantly surrounded by intensively managed agricultural arable land. In visual characteristics of the landscape image there are oak and beach-oak forest complexes visible in the background, the middle part is taken by vineyard complex and the foreground is covered by a newly established large area vineyard which continues to a large area composed of blocks of arable land. Those structures visually create a very interesting sequence of landscape elements from the northern slopes to the southern lowlands and show high visual potential.

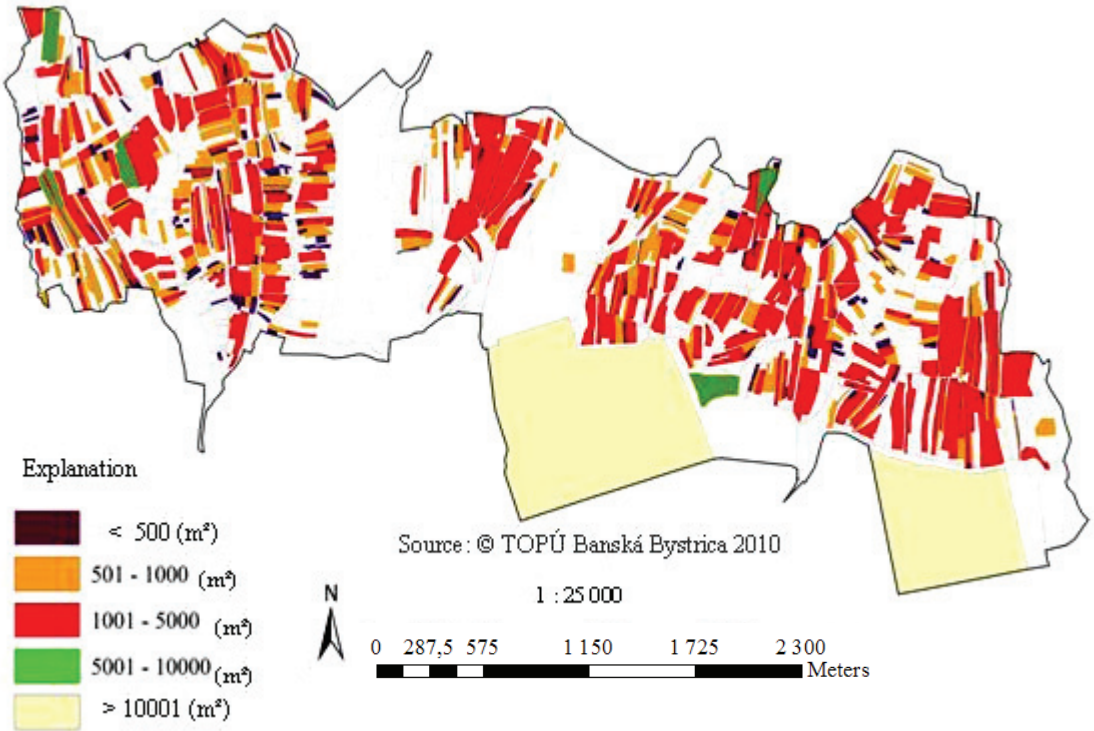
From the viewpoint of the plot area structure and the changes of vineyard landscape segment the structure of parcels according to 5 category of the area size were assessed (Table II.) Higher number of the plots was identified of area size 1,000 to 5,000 m² (0.1–0.5 ha). There are 345 parcels in the total area of 61.067 ha that represents 44.1% of all the vineyards area. The second area size category of over 10,000 m² (1.0 ha) is represented by two parcels only and takes up altogether 42.287 ha, it means 30.52%. From this group 1 parcel reaches 27.92 ha. Both parcels belong to large size plots. They were established between 2007 and 2010 and represent new progressive vine growing technologies and new plant sorts and cultivars. The third area size group of 500 to 1,000 m² takes up 17.87% of all vineyard areas and was inventoried especially at slopes and more shallow soils, very often terraces such as anthropogenic relief forms with anti-erosion effect occur. The vineyard parcels space distribution in the countryside according to area size is shown in Fig. 2.

The dominant shape of smaller parcels is a narrow striped rectangle, coursed downhill on slopes reasonably for reception of more solar radiation that is beneficial for grape quality. Older and small scale vineyard parcels have more dense inner structure in distance between rows. Spread out old vine growing forms as vine-stakes are very rare. At the borderline of vine plots, close to wine cellars and along with roads the common known fruit trees such as cherries, plums, pears and apples are spread out. Relatively in high abundance at small scale vine plots were recorded rare thermophile fruit trees e.g. black mulberry, service tree, almond tree, medlar, and quince tree. In many cases objects of sacral architecture such as a crucifix, chapel and the statue of Saint Urban were inventoried.

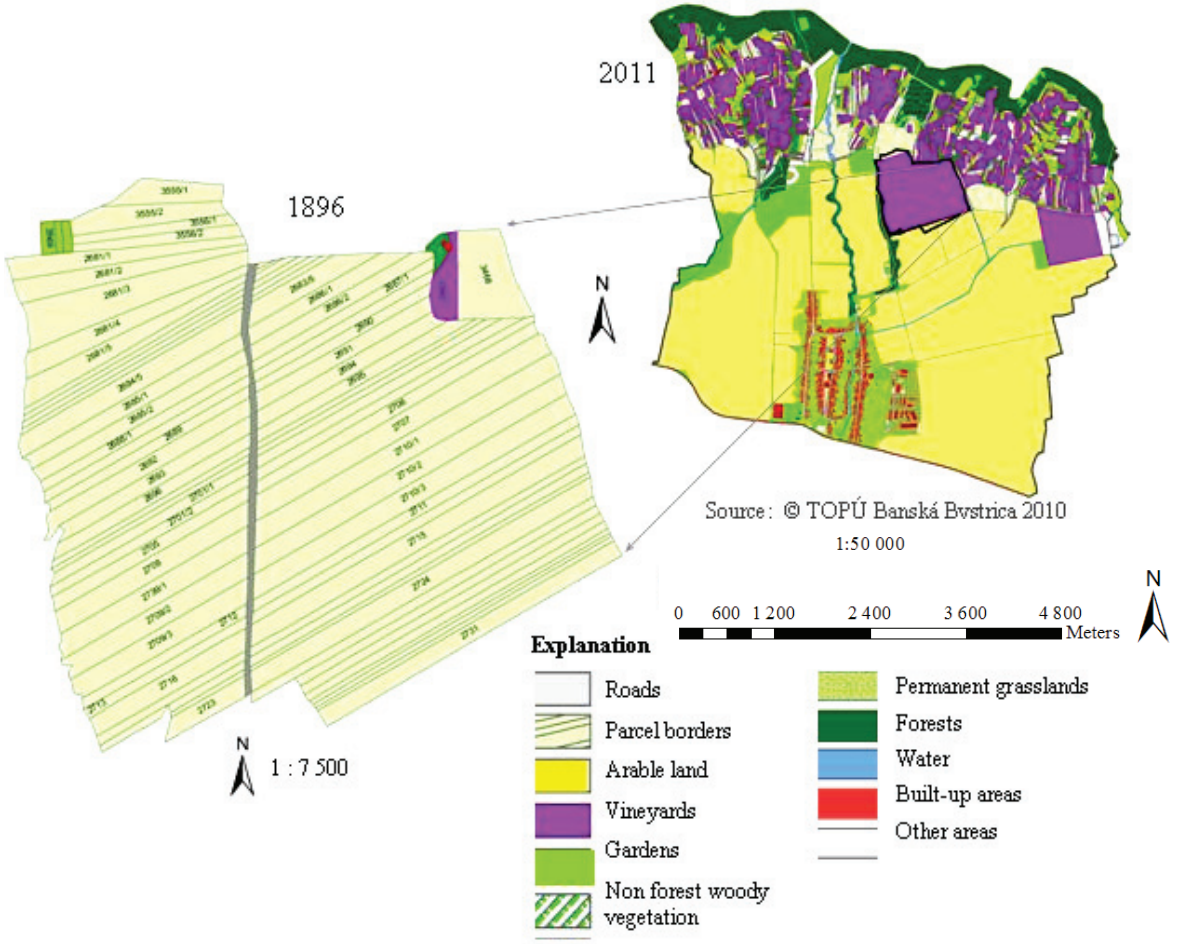
The large area vineyard parcels generally over 0.5 ha have such inner structure which enables usage of technologies including machinery techniques. There are no additional fruit trees or anthropogenic relief forms and rows are in larger distance from each other. Large area vineyards are spread at lowlands or moderate slopes. Small wine houses and cellars are absent and/or might be substituted by built–up areas such as large buildings with multifunctional services related to vine growing, wine production, wine storing, gastronomy and complex of agrotourism.

Cultural and historical assessment of vineyards

The assessment of historical values of vineyard landscape at the Čajkov cadastre is based on the structure of vineyards plots and is compared in the periods between 1896 and 2010, or 2011 (Fig. 3, 4). Vineyard structure of landscape segments also shows level and land-use form changes as well as measure of quality preservation and historical continuity in the course of almost 100 years. Fig. 3 shows the landscape segment in the northern part of vineyards spread out in the vicinity of the forest zone. In this part the relief is more dynamic, with steeper slopes, shallow soil and terraced plots, where no changes or very insignificant ones were recorded in the area size, number of parcels and



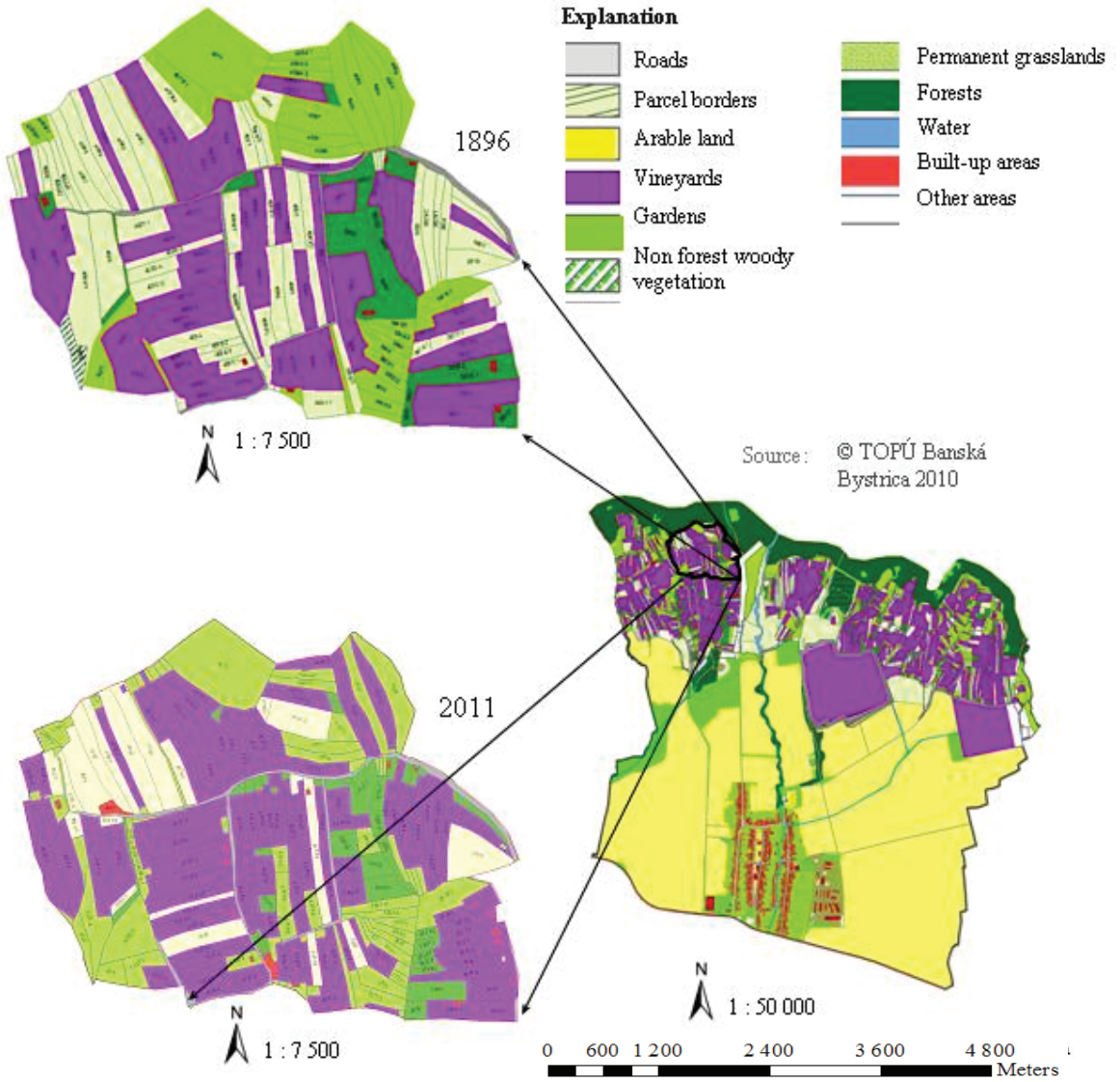
3: *Spatial distribution of the vineyards plots according to five area size categories (author: M. Verešová)*



4: *Comparison of land use changes from the mosaic narrow-striped fields in 1896 to a large-block vineyard in 2011 (author: M. Verešová)*

land use forms. The area share of vineyards is increased and the share of gardens decreased only within the compared periods of 1896 to 2011. This situation is a reflection of vineyards ownerships, when in the 50s of 20th century the processes of agriculture collectivisation did not take place. It also confirms human generation continuity in vine growing activities which reflect into continuity of the vineyard landscape structure. The mosaic form of landscape image is dominant as a component of remarkable culture historical values. This pattern structure is well preserved at almost 70% of all vineyards in the Čajkov cadastre.

Fig. 4 shows the landscape structure changes at the southern border area of vineyards in transition to the large blocks of arable land. Compared time sequences are 1896 to 2010. Cadastre map from 1896 shows a narrow striped parcel structure in predominant land use forms such as grasslands. On the northern border of the landscape segment there are two plots with a different land use such as gardens and vineyards. In comparison to the situation in 2010 substantial changes took place. The soft narrow striped parcel structure was replaced by large-scale vineyard with area of 27.92 ha planted from 2008 to 2010 according to the principle of modern vine growing technologies. On the eastern border of the cadastre there is another large-scale modern vineyard with area of 14.36 ha. Both of these vineyards create a dominant component in the foreground of the historical vineyard structures. In order to ascertain vineyard structure changes as a result of agriculture collectivisation, two time periods are compared, i.e. 1949 to 2010 (Fig. 5). Almost no changes are shown on the compared map sectors. It means that small-scale private vineyards have not undergone collectivisation processes and therefore represent historical values and continuity. From the viewpoint of landscape image of all cadastre in view axis from the Čajkov settlement to the north shows an excellent landscape scenery sequence with appropriate value until high degree of visual exposition in the following order (see Fig. 1, 3, 4): large area blocks of arable land, large-scale of vineyards, small-scale mosaic structure of vineyards, massive complex of beech-oak forests of Štiavnické vrchy Mts. The cadastre landscape has a complex and continual character with balanced representation of historical vineyard structure



5: *Comparison of vineyard plots in 1896 and 2011 at vineyard chosen segment. Almost no changes are seen and it has historical value and continuity (author: M. Verešová)*

segments and large-scale blocks of progressive agricultural technologies.

In the second part of the cultural and historical values assessment we have provided questionnaire investigation with 145 respondents - owners of vineyard parcels representing 20 ha vineyards altogether. From a wide spectrum of received data the regards were laid also to characteristics of cultural and historical values of vineyards. The following marks and characteristics registered at the vineyard parcels were assessed as contributes to their cultural and historical values:

a) Age of vineyards – as historically valuable the vineyards over 100 years old are taken into consideration. This age limit is true for 70% of all contemporary vineyards and 100% of historical small scale vineyards in the landscape segment.
b) Area size of vineyard parcels under 0.5 ha – as a mark of small mosaic vineyard structure, when in this category there were 67.05% vineyards registered.
c) Occurrence of old and specimen rare fruit trees –trees over 80 or 100 years of age are considered valuable, when from registered trees 16% were delineated to this category, e.g. especially black mulberry, and service tree.
d) Archaic vine growing technologies especially climbing support of vine-stakes - they are rare and seen sporadically, less than 3% of all vineyard area was registered in the assessed vineyards.
e) Occurrence of old local or regional sorts of vine – in historical documents almost 15 specific sorts such as Gučky, Marča, Bako, Kozie cecky are described. From those a few were well-preserved

in rare utilisation, because vine plant sorts have undergone modernizing.

f) Vineyard houses and cellars with typical attributes of regional architecture – results received from questionnaire investigation are as follows: 7% of the houses and cellars were built before World war I, 17% – between 1920 and 1945, 19% – between 1946 and 1968, 17% – between 1969 and 1989, 40% – between 1990 and 2009. The first two groups represent historically and architectonically valuable objects. After World war II the larger vineyard constructions were built with poly-functional services, e.g. wine production and storing, recreation and leisure, hospitality.

g) Elements of anthropogenic relief – occurred very often especially on the steep slopes and small – scale parcels, e.g. terraces, stone walls, drainage canals.

h) Elements of sacral architecture with spiritual and symbolic meaning – the Saint Urban statue, i.e. the vineyard patron, occurred most frequently. Altogether 7 elements of sacral architecture (statue, chapel, and sacrum) were recorded in the examined vineyards.

i) Occurrence of archaeological locality and findings – artefacts from the age of Lengyel culture (stone instruments and jewellers) were found in the area of established and new large scale vineyards.

According to the described characteristics the cultural and historical values were evaluated as follows: high (occurrence of 6–9 marks), medium (3–5 marks), low (1–2 marks), in accordance with the method of Supuka and Verešová (2012). We consider the segment of the studied vineyard landscape structure at the Čajkov cadastre high with emphasis on cultural and historical values.

DISCUSSION

The changes and development of the historical landscape of Slovakia have been the focus of study by many authors already for a longer time. Huba (2000) paid attention to the historical importance of culture, traditional land use forms and regional variability of the Slovak rural country. Rural values in later day approaches are assessed for recreation and agrotourism services (Otepka and Habán, 2010), also contributed by vineyard type of cultural landscape, accompanied by traditional events and activities related to so-called vine routes (Supuka, Verešová and Šinka, 2011). Rural and especially vineyard landscape creates a specific landscape image with high aesthetic values (Antrop and Van Eetvelde, 2000; Štefunková and Cebecauer, 2006), where valuable elements of rural architecture are also represented (Štěpánková and Feriancová, 2011; Verešová, 2011). Petit, Konold and Höchtl (2012) worked-out particular methodical approaches for assessment of cultural and historical values of the vineyard landscape in Germany according to occurrence of features such as parallel cultivation, fruit trees, retaining walls and stairs, ownership structure, hoeing of the soils. Similar indicators were used in historical vineyard assessment in Slovakia, in the Small Carpathian region (Špulerová *et al*., 2011; Štefunková *et al*., 2011), in the Nitrianske Hrnčiarovce cadastre (Supuka, Verešová and Šinka, 2011), but supplemented by other marks such as anthropogenic relief, age of vineyards, viticulture traditional technology, regional cellar architecture, etc. Salašová and Štefunková (2009) describe aesthetic values of vineyard landscape, and pay attention to 13 features important in vineyard aesthetic assessment, e.g. visual exposition and interconnection, shape and size of plots and mosaic structure occurrence, proportion of aesthetic elements in the landscape structure, technical equipment and the level of vineyard maintenance. Some differences are seen in a number of assessed characteristics and occurrence of specific regional marks. All published articles evaluated marks and functions of vineyard landscape in high range because architectonical image and man-made cultural artefacts were very specific in the context of landscape.

CONCLUSIONS

The vine belongs to the oldest cultural woody climbing plants of Europe and Asia. Out of 70 original wild natural species, almost 40 species of *Vitis* genus have been selected and introduced to the plant culture later. Almost a thousand years ago the vineyards formed the landscape structure and image of the Slovak countryside. The paper deals with vineyard structure development in the Čajkov cadastre that belongs to the Nitra viticulture region. At present time the assessed Čajkov cadastre has a high cultural and historical value with well-preserved vineyard structure in a landscape segment that keeps high cultural fruit plant diversity and a cultural landscape values as well. The new vineyard represents a new period and modern technology, but maintains vine-growing continuation in the Nitra region.

6: *Historical vineyard structure with small area plots (author: J. Supuka)*

7: *The new established vineyards with large area plots in winter image (author: J. Supuka)*

8: *Terraced small area vineyards with old fruit trees in background (author: J. Supuka)*

9: *The wine house in typical regional architecture (author: J. Supuka)*

SUMMARY

The cultural landscape as a product of long-term influence of the man to the natural elements is in the spotlight of a contemporary cultural society. One of those are vineyards as a subcategory of the rural landscape. Their space characteristics and internal structure as a reflection of cultivation technologies are the objective of the visual aesthetic and historical value assessment. The contribution is aimed at assessment of landscape structure changes and historical value of the Čajkov cadastre, where vineyard takes up 6% of the defined territory. The land use changes are compared within two periods: 1896 and 2010, or 2011, where vineyards maintain an almost 100-year continual structure in plot size and in land distribution. This reality is confirmed by aerial photos from 1949 and 2010 as well. Cultural and historical values of vineyards were assessed by using 9 differential criteria. The following classification characteristics were used: age of vineyards, occurrence of archaic cultivation technologies, anthropogenic relief forms, vineyard cellars and sacral architecture elements, rare and historical fruit trees, local vine sorts and archaeological localities. Resulting in final values, the assessed segment of viticulture landscape has a high historical value and unique landscape structure in the framework of the Čajkov cadastre.

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