

# INVENTORY AND CLASSIFICATION OF HISTORICAL STRUCTURES OF THE AGRICULTURAL LANDSCAPE IN SLOVAKIA

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## Abstract

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Historical structures of the agricultural landscape (HSAL) hold a special position among historical landscape structures. The HSAL inventory in Slovakia aimed at countryside mapping entitled “Research and maintaining of biodiversity in historical structures of agricultural landscape of Slovakia”. This was established to provide new knowledge of HSAL distribution and conditions in Slovakia. The HSAL database provides outcomes of field mapping and identification of HSAL and their classification throughout Slovakia. The sum of 626 HSAL polygons was recorded in the field, and a total of 3033 polygons were identified as HSAL based on aerial photos.

From a land use viewpoint, 4 classes of HSAL were distinguished under the following classification scheme: (1) Historical structures of the agricultural landscape with dispersed settlement, (2) Historical structures of vineyards' landscape, (3) Historical structures of arable-land, grasslands and orchards and (4) Historical structures of arable-land and grasslands. The most frequent classes encountered are the Historical structures of arable-land and grasslands, and then the HSAL with dispersed settlement.

*Key words:* classification, cultural landscape, historical structures

## Introduction

Cultural landscapes represent the combined works of nature and man and they are illustrative of the evolution of human society and settlement over time. These have occurred under the influence of physical constraints and/or opportunities presented by their natural envi-

ronment and of successive social, economic and cultural forces, both internal and external (UNESCO, 2008). Historical landscape structures create a special type of cultural landscape and they are found in areas where past human activities marked the landscape with characteristic signs. These are visible signs which determine the entire landscape character, or alternatively they can be obscured and hidden for those who are not concerned. Historical areas shelter a wealth of information about past ways of life and this can be interpreted from their structures (Hudecová, 2006).

The European Landscape Convention (2000) stimulated the creation of landscape inventories for assessing their condition and setting up monitoring systems to follow and manage the changes. Several countries in Europe already had a long tradition in this field, but it was mainly focused on the effects of land cover change in relation to biodiversity (Dramstad et al., 2001; Haines-Young et al., 2000; Holdaway, Smart, 2001; Aalen et al., 1997; Wrška et al., 1997; Ihse, 1996). In many countries, new landscape classifications are being developed and mapping of landscape characteristics is considered the basis for landscape assessment (Antrop, 2005; Pinto-Correia et al., 2002; Somper, 2002; Bezák et al., 2010). The following differing landscape description methods and approaches have been identified: (1) the physical geography approach, (2) the landscape history approach, (3) the landscape ecology approach and (4) the landscape perception and aesthetics approach (Pungetti, Kruse, 2010). Therefore, the classification of historical landscape structures is also problematic and difficult. Huba (1988) lists the following approaches:

- the traditional approach to protect monuments and historic sites, including historical zones,
- the chronological approach – ancient, medieval and modern structures,
- the settlement-geographic approach – rural, city and other landscapes,
- the geo-ecological approach – mountain and lowland structures or warm, moderate and cold climate units, or geo-botanical units, etc.,
- the approach from a functional viewpoint – in accordance with the actual division of economic sectors including agriculture, crafts, mining industry, timber production and water management, etc.,
- the approach based on territorial-governmental – administrative units,
- the approach from a geometric viewpoint – consisting of points (solitary monuments), and lines (historical trade roads, channels, alleys and calvaries) and plots (historical city centres and parks).

The identification of historical landscape structures is connected with the research of culture-historical phenomena in the landscape (Jančura, 1998). Structural forms are connected with the functions of their single components. Since each part of landscape structure is differentiated in time, bearing traces of different ages, we can study and identify the regularities of their structure in this way. Knowledge of these regularities helps establish a common expressional platform of landscape-ecological approaches with environmental design and formation of the landscape.

The **historical structures of agricultural landscape (HSAL)** holds a special position among the historical landscape structures, since they host a significant part of biodiversity

in Slovakia. HSAL being a part of cultural landscape represent a mosaic of small-scale arable fields and permanent agricultural cultivations such as grasslands, vineyards and high-trunk orchards. They are significant as unique islands of species-rich plant and animal communities, originated by continuous evolution over centuries. Because the agricultural landscape represents almost half of the territory of Slovakia, HSAL play an important role in production as well as in ecology. They originated as a result of long-term mutual relationship between man and the landscape and they depend on continuous agricultural activity. However, they have been marginalized due to complicated developmental trends in society and currently they are no longer a subject of interest from a production perspective (Dobrovodská, Štefunková, 1996). These areas are now becoming rare and therefore they are highly valuable throughout Europe.

The inventory of historical structures of agricultural landscapes in Slovakia was the aim of the countryside mapping entitled “Research and maintenance of biodiversity in historical structures in the agricultural landscape of Slovakia“, which will provide new knowledge concerning the distribution and conditions of HSAL in Slovakia.

## Methodology

To identify HSAL throughout the Slovak Republic territory, we combined the methods of visual interpretation of aerial photos and field survey. We did it in the following steps (Dobrovodská et al., 2010a):

1. Location of HSAL.

The presence or absence of HSAL in 1 km<sup>2</sup> grid network was determined from aerial photos using Google Earth.

2. Field mapping.

Statistical sampling was used to select 10% of the sites located in the grid network for the Natural-settlement nodal regions of Slovakia (Miklós, 2002). These are a product of harmonisation of natural-nodal regions within community administrative boundaries.

The selected sites of HSAL were mapped according to the handbook produced for this purpose by Dobrovodská et al. (2010b). This handbook introduces the methodology proposed for complex inventory of HSAL throughout the entire territory of Slovakia in record form. According to this methodology, HSAL are defined as structures of extensively cultivated fields, meadows, pastures, orchards and vineyards or recently abandoned plots of early succession stages, which have been unaffected by agricultural collectivization. HSAL are characterized by small-scale structure of plot division, and by unchanged ways of land use during socialistic collectivisation, or by preserved forms of anthropogenic relief, or by preserved features of traditional agricultural technologies. For each HSAL site verified in the field, a record form was completed in compliance with the mapping key. This form consists of 3 parts: (A) basic data, (B) characteristic of HSAL and (C) additional information. To identify the forces and pressures on HSAL, notes on present land use and on the main driving threats were recorded in the field. Additional information had to provide increased knowledge of the significance and the historical, cultural and natural value of the HSAL. It was aimed at the registration of elements of small architecture and significant species and habitats. Attention was also devoted to the expansion of invasive species which pose threats to biodiversity in these semi-natural habitats originating in the HSAL.

3. Identification and description of all HSAL polygons located from aerial photos in GIS with eventual input from field mapping.

The recorded characteristics were: intensity of land use, the presence of land use elements, abundance of non-forest vegetation, shape of land parcels, relief configuration of parcels and the presence of visible forms of anthropogenic relief (FAR).

4. Classification of HSAL in Slovakia.

At the first level, HSAL were distinguished according to being shaped by a distinctive land use elements such as dispersed settlements, vineyards and orchards, as depicted in the classification scheme in Fig. 1. At the second level of classification, HSAL were distinguished according to the differing extent of present land use elements, including arable land and grasslands. In the third level, the types and proportion of non-forest woody vegetation that forms the pattern of HSAL were considered.

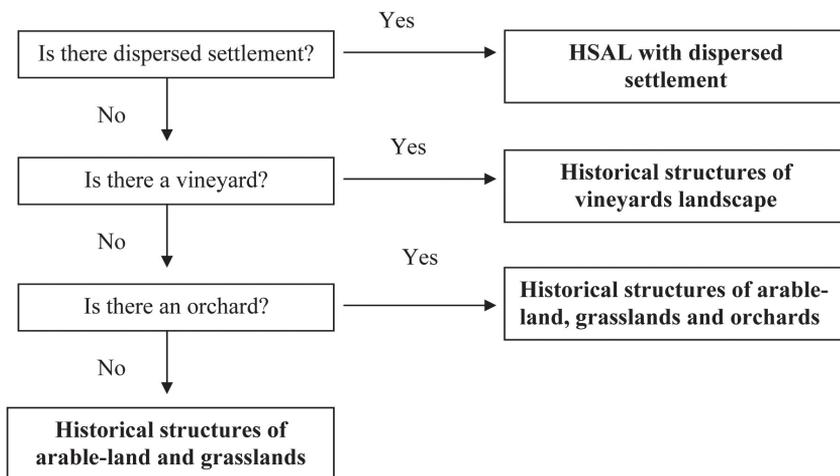


Fig. 1. Classification scheme of historical structures of agricultural landscapes.

## Results

The presence of mosaic structure of the agriculture landscape and the presence of non-forest woody vegetation (NFWV) that potentially indicates HSAL was identified in 4,828 squares of 1 km<sup>2</sup>. Approximately 10% of sites were selected randomly by statistical sampling and these were verified and mapped in the field.

The outcomes of the field mapping and identification of HSAL is the database of HSAL and their classification for the whole of Slovakia. Altogether, 626 polygons of HSAL were recorded in the field and a total of 3,033 polygons were identified as HSAL based on aerial photos.

From a land use viewpoint, 4 classes of HSAL were distinguished following the classification scheme: (1) Historical structures of agricultural landscape with dispersed settlement, (2) Historical structures of vineyards landscape, (3) Historical structures of arable-land, grasslands and orchards and (4) Historical structures of arable-land and grasslands. The most frequent classes were found to be Historical structures of arable-land and grasslands (1,192 polygons, 152.64 km<sup>2</sup>), followed by HSAL with dispersed settlement (1,133 polygons, 174.98 km<sup>2</sup>) (Fig. 2).

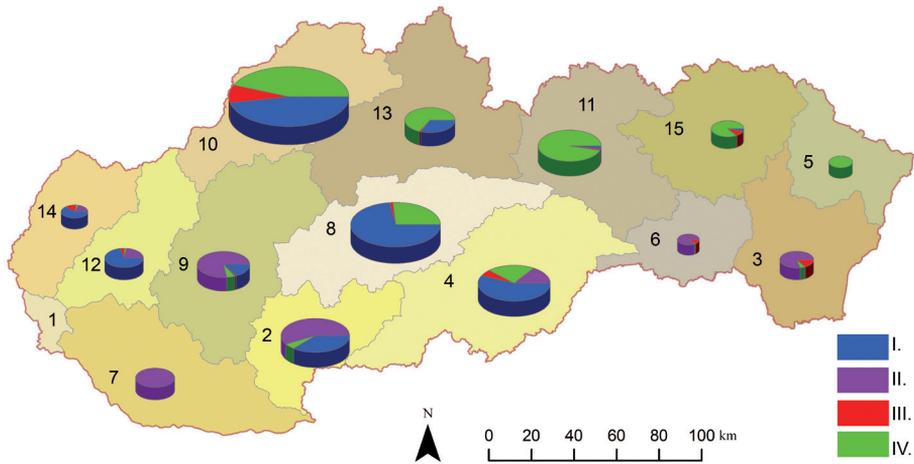


Fig. 2. Distribution of HSAL in Natural-settlement nodal regions of Slovakia.

Legend: I. Historical structures of agricultural landscape with dispersed settlement, II. Historical structures of vineyards landscape, III. Historical structures of arable-land, grasslands and orchards, IV. Historical structures of arable-land and grasslands.

Regions: 1. Bratislavsko-metropolitný, 2. Dolnohronsko-dolnoipeľský (hontský), 3. Dolnozemplínsky, 4. Novohradský, 5. Hornozemplínsky, 6. Košický, 7. Podunajský, 8. Pohronský, 9. Poniatriansky, 10. Považský (Trenčiansko-žilinský), 11. Spišský, 12. Trnavský, 13. Turčiansko-liptovsko-oravský, 14. Záhorský, 15. Šarišský.

As is apparent on the map in Fig. 2, the distribution of HSAL throughout Slovakia is not balanced (Table 1). HSAL have been mostly preserved in mountain regions which were unsuitable for intensive agriculture or the settlement was too dispersed to provide large reclamation of arable land and the establishment of agricultural cooperatives. The largest proportion of HSAL was recorded in the Považský and Pohronský regions, where HSAL with dispersed settlement and Historical structures of arable-land and grasslands are well preserved. HSAL were very rarely located in lowlands of the Podunajský, Záhorský and Košický regions which constitute the most productive agricultural areas and most of HSAL are represented by historical structures of vineyard landscape that have been preserved at the foothills of hilly areas.

**HSAL with dispersed settlement** are distributed mostly in mountainous areas in the Považský (Trenčiansko-Žilinský), Pohronský and Gemersko-Novohradský regions. They are composed of dispersed settlement buildings and agricultural plots, e.g. arable land, grasslands, orchards, and rarely of vineyards in southern Slovakia. Collectivisation in agriculture changed the landscape character in many regions with dispersed settlement (Petrovič, 2006). Many agricultural mosaics were merged into large-block fields and the elimination of private cattle and sheep breeding caused abandonment of grasslands. Relationships between human and the agricultural land were interrupted and changes of employment structure and a decrease in local residents led to a decrease in traditional management of HSAL with dispersed settlement. Thus, historical structures are slowly disappearing with buildings being

Table 1. Area of HSAL (ha) in Natural–settlement nodal regions of Slovakia.

Regions	I.	II.	III.	IV.	Total
Dolnohronsko-Dolnoipel'ský (Hontský)	1556,9	2267,7	7,9	203,4	4035,9
Dolnozemplínsky		785,3	139,1	64,3	988,7
Gemersko-Novohradský	2492,3	596,5	220,3	1209,6	4518,7
Hornozemplínsky			3,7	477,8	481,5
Košický		367,9	47,1	7,0	422,0
Podunajský		1324,1			1324,1
Pohronský	5028,2		116,7	1848,5	6993,4
Ponitriansky	347,1	1855,5	24,3	158,3	2385,2
Považský (Trenčiansko-Žilinský)	5946,5		865,3	5664,2	12475,9
Spišský	70,3		39,8	3332,0	3442,0
Šarišský	32,4		85,7	802,9	921,0
Trnavský	902,4	288,1	68,7	25,8	1285,1
Turčiansko-Liptovsko-Oravský	725,5		25,7	1443,8	2195,0
Záhorský	370,4	115,5	108,1	22,3	616,3
<b>Total</b>	<b>17472,0</b>	<b>7600,6</b>	<b>1752,5</b>	<b>15259,9</b>	<b>42085,0</b>

Notes: I. Historical structures of agricultural landscape with dispersed settlement; II. Historical structures of vineyards landscape; III. Historical structures of arable-land, grasslands and orchards; IV. Historical structures of arable-land and grasslands.

eventually transformed into recreational houses. The main object of our interest was areas where traditional primary land use was unchanged during socialist agricultural collectivisation and HSAL were still preserved. Original forms of anthropogenic relief, however, have been preserved in some regions. Based on the presence of land use elements, we identified the following types of HSAL with dispersed settlement (Fig. 3):

- Historical structures of dispersed settlement with dominant orchard plots (101), where orchards were dominant and grasslands and arable land could also be present. These mosaics are often surrounded by large blocks of arable fields and grasslands and they constitute the only remnants of the former larger areas of dispersed settlement and orchards.
- Historical structures of dispersed settlement landscape with dominant grassland plots (102), where grasslands predominated and, orchards and arable land were also present. This type of mosaic is the most frequent.
- Historical structures of dispersed settlement landscape with mosaic of grasslands and arable land (103), where no land use types dominate. This type of historical structures is mainly spread in mountainous regions with unsuitable natural conditions for orchards.
- Historical structures of dispersed settlement landscape with a mosaic of orchards, grasslands and arable land (104), where mosaics surrounding dispersed settlements were created with orchards and grasslands, while the arable land was often rare, and sometimes absent.

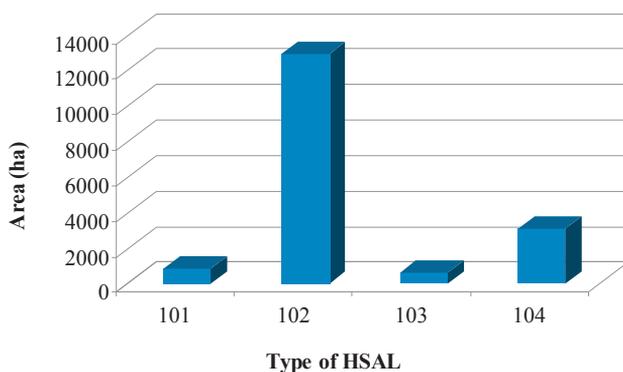


Fig. 3. Area of the types of HSAL with dispersed settlement.

Notes: 101 – historical structures of dispersed settlement with dominant orchards plots; 102 – historical structures of dispersed settlement landscape with dominant grassland plots; 103 – historical structures of dispersed settlement landscape with mosaic of grasslands and arable land; 104 – historical structures of dispersed settlement landscape with mosaic of orchards, grasslands and arable land.

The **Historical structures of vineyards landscape** are distributed in the regions of southern Slovakia of Dolnohronsko-Dolnoipel'ský (Hontský), Dolnozemplínsky, Gemersko-Novohradský, Košický, Podunajský, Ponitriansky, Trnavský and Záhorský. These are created in a mosaic of usually dominant vineyards, often combined with orchards, grassland and seldomly with arable fields. Infrastructure and buildings such as viticulture houses, cellars with holiday houses, and cottages are also a significant element of this mosaic, since their presence is correlated with the degree of land use. When buildings are present, the mosaics are generally regularly managed and this management directly maintains the mosaic of the historical landscape. However, cellars and small viticulture houses were often enlarged and rebuilt into weekend houses, and the traditional land use was often reduced. Occasionally, it was a problem to identify HSAL from a temporal viewpoint, whether the small-scale structure of plot division is historical, or it was changed in the last century. After creation of the HSAL database based on aerial photos, another problem presented itself. This involved the distinction between orchards and non-forest woody vegetation. Classification of historical structures in the vineyard landscape was performed on the basis of current land use elements creating mosaics. Even though some land use categories such as orchards and cellars are rare, their presence is important. When arable field occurrence in the vineyard landscape is rare, this is relatively unimportant. The following types of historical structures of vineyards landscape were identified (Fig. 4):

- Historical structures of vineyards landscape with dominant vineyards and with orchards. Here, two subtypes are distinguished, those without buildings (code 210) and those with buildings (211). While vineyards are dominant in mosaics, orchards and arable lands are subdominant or rare. The subtype with buildings is more widely spread, while the subtype without buildings is very rare in Slovakia with only 14 plots being recorded.

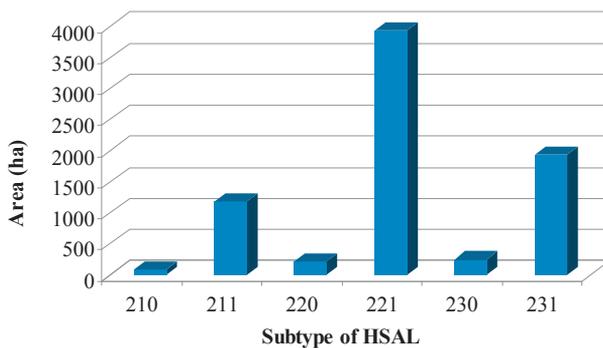


Fig. 4. Area of the subtypes of historical structures of vineyards landscape types.

Notes: 210 – historical structures of vineyards landscape with dominant vineyards and with orchards without buildings; 211 – historical structures of vineyards landscape with dominant vineyards and with orchards and with buildings; 220 – historical structures of vineyards landscape with dominant vineyards and with other land use forms without buildings; 221 – historical structures of vineyards landscape with dominant vineyards and with other land use forms and with buildings; 230 – historical structures of vineyards landscape with different non-dominant land use forms without buildings; 231 – historical structures of vineyards landscape with different non-dominant land use forms and with buildings.

- Historical structures of vineyards landscape with dominant vineyards and with other land use forms. Here, two subtypes are distinguished, those without buildings (220) and those with buildings (221). Vineyards are dominant in mosaics while arable land or grasslands are subdominant or rare and orchards are absent. This type covers more than a half the area of historical structures of vineyards landscape.
- Historical structures of vineyards landscape with different non-dominant land use forms, either lacking buildings (230) or possessing them (231). In the mosaics of different land use elements, neither vineyards, orchards, grasslands nor arable lands dominate.

**Historical structures of arable-land, grasslands and orchards** are spread throughout Slovakia. One exception is the Podunajský region which has only small remnants of HSAL. The main orchard regions are the Považský (Trenčiansko-Žilinský), Gemersko-Novohradský, Dolnozemplínsky and Ponitriansky regions, which have an ancient fruit-growing tradition. Historical structures of arable-land, grasslands and orchards are composed of miscellaneous mosaics of arable land, grasslands and orchard plots. They are wide-spread in sub-mountainous regions which have favourable climate, appropriate soil and other environmental conditions for planting orchards. Additionally, original forms of anthropogenic relief have been preserved in some regions with occasional lines of fruit trees planted at the edges of plots or along the streets. Based on the presence of land use elements, the following types of HSAL were identified (Fig. 5):

- HSAL with dominant arable land and with grasslands and orchards (301). This is in a mosaic composed of dominant arable land, while grasslands and orchards are subdominant or rare. Since traditional management of arable fields is currently declining, this type of mosaic is very rare.

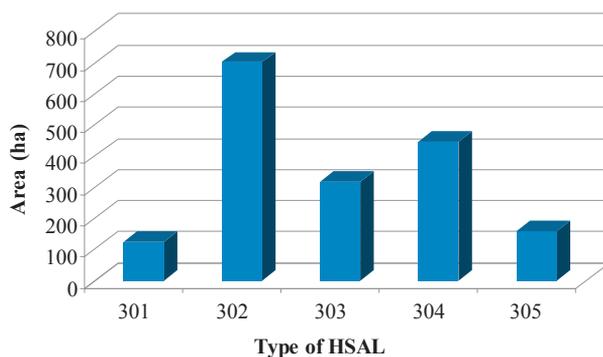


Fig. 5. Area of the types of historical structures of arable-land, grasslands and orchards.

Notes: 301 – HSAL with dominant arable land and with grasslands and orchards; 302 – HSAL with dominant grasslands and with orchards; 303 – HSAL with dominant orchards; 304 – HSAL with arable land, grasslands and orchards; 305 – historical structures of orchards.

- HSAL with dominant grasslands and with orchards (302). This is a mosaic composed of dominant grasslands, while orchards and arable land are subdominant or rare, or arable land is absent. Two subtypes of these historical structures with non-dominant or absent arable land have been distinguished. However, this is only based on field surveys because it was difficult to identify plots of arable land with only aerial photos. This type of mosaic is more frequent.
- HSAL with dominant orchards (303). This is a mosaic composed of dominant orchards, while grasslands and arable land are subdominant or rare and arable land is absent.
- HSAL with arable land, grasslands and orchards (304). This is a mosaic composed of grasslands, orchards and occasionally with plots of arable land. None of the land use categories is dominant, and all elements are being subdominant or rare.
- Historical structures of orchards (305). This occurs in landscapes where only old high-trunk orchards are dominant, but other elements may also be present.

**Historical structures of arable-land and grasslands** are distributed throughout the whole of Slovakia, except in the Podunajský region. Their largest proportions are in the Považský (Trenčiansko-Žilinský) and Spišský regions. They consist of a mosaic of arable land or grasslands, and are mainly situated in mountainous regions with unfavourable conditions for intensive large-scale agriculture. The presence of anthropogenic relief forms such as terraces or terraced balks, stony dykes, banks or walls have often been recorded. These structures originated on steep terraced slopes or on stony soils, when the stones had been removed and laid on the field edge. Non-forest woody vegetation is often an essential element of this landscape structure, composed especially of lines of trees, solitary trees are being less frequent and some woodland remnants present. Based on the presence of land use elements, the following types of HSAL were identified (Fig. 6):

- HSAL with dominant arable land and with grasslands (401). Here, most of the land is cultivated as arable land, and grasslands are subdominant or rare. This type of HSAL is

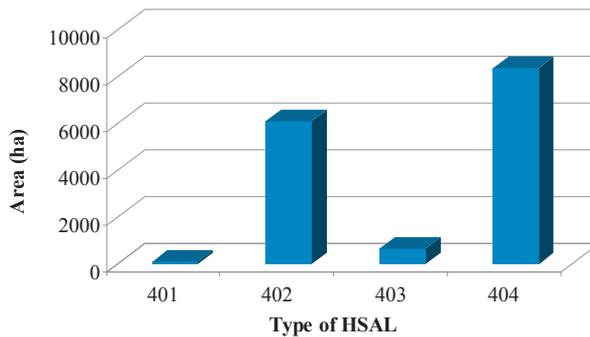


Fig. 6. Area of the types of historical structures of arable-land and grasslands.

Notes: 401 – HSAL with dominant arable land and with grasslands; 402 – HSAL with dominant grasslands and with arable land; 403 – HSAL with mosaic of grasslands and arable land; 404 – historical structures of grassland landscape.

quite rare as a consequence of intensification in agriculture, the merging of mosaics and a decline in traditional management.

- HSAL with dominant grasslands and with arable land (402). This has a mosaic of grasslands and arable land, where grassland plots are dominant. These structures are very frequent and this indirectly reflects the trend of a decrease in the extent of arable land and the transformation of fields into grasslands.
- HSAL with mosaic of grasslands and arable land (403). These mosaics are composed of grasslands and arable land where none of the land use elements dominate.
- Historical structures of grassland landscape (404). Here, grass-covered mosaics represent original meadows and pastures or grass-covered former arable fields which were very often tessellated and they cover more than a half of the historical structures of arable-land and grasslands.

#### *Non-forest woody vegetation*

Woody vegetation very often constitutes part of the pattern of historical landscape mosaics. According to the cover and the proportion of forms of non-forest woody vegetation in HSAL, 5 categories of non-forest woody vegetation forms were identified:

- The rare occurrence of woody vegetation, where its cover in HSAL is under 10%.
- The subdominant occurrence of all forms of woody vegetation, where the cover of solitary trees and shrubs, the lines of trees and shrubs and the woodland remnants is below 10 or 50%. Their total cover is above 10%.
- The dominant occurrence of solitary trees and shrubs where their cover is over 50% of non-forest woody vegetation, and other forms may be present.
- The dominant occurrence of lines of trees and shrubs where their cover is over 50% of non-forest woody vegetation, and other forms may be present.

- The dominant occurrence of remnants of woodland, where their cover is more than 50% of non-forest woody vegetation, and other forms may be present.

Fig. 7 shows the proportion of woody vegetation categories in different classes of HSAL. The most occurring dominant form of woody vegetation is the lines of trees, as these were often spread or planted on the edges of land use elements (Fig. 8).

## Conclusion

The rural agricultural landscape represents a significant part of Slovakia's national cultural heritage, especially the areas with preserved historical landscape structures. Even though a large proportion of HSAL have been destroyed since the second half of the last century and they are currently small-scaled, their high number and diversity of natural and cultural-historical conditions favour a high heterogeneity of HSAL types. It is presumed that the area of historical structures of agricultural landscape was much larger, as it is documented on historical maps. However, many boundaries and terraces have disappeared and were destroyed since the last half of century. As a consequence of natural factors and human intervention on the landscape, the area of delimited HSAL based on field surveys and aerial photo was 42,085 ha, which comprises only 0.9% of the entire area of Slovakia. How-

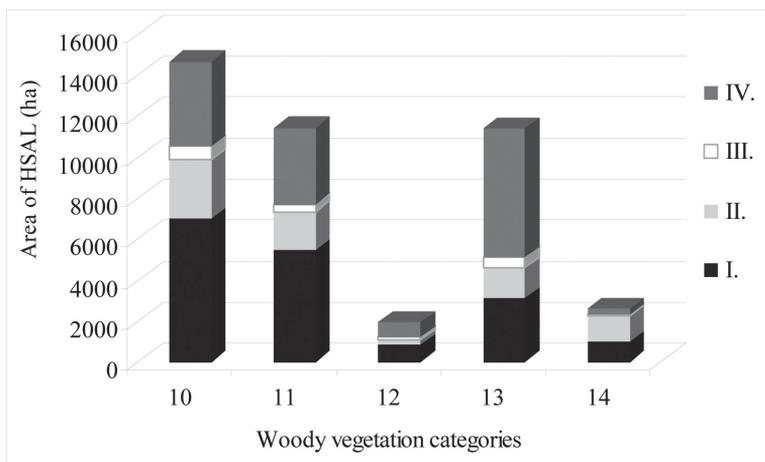


Fig. 7. Proportion of woody vegetation categories in different classes of HSAL.

Notes: I. Historical structures of agricultural landscape with dispersed settlement; II. Historical structures of vineyards landscape; III. Historical structures of arable-land, grasslands and orchards; IV. Historical structures of arable-land and grasslands.

Vegetation form categories: 10. Rare occurrence of woody vegetation; 11. Subdominant occurrence of all forms of woody vegetation; 12. Dominant occurrence of solitary trees and shrubs; 13. Dominant occurrence of lines of trees and shrubs; 14. Dominant occurrence of remnants of woodland.



Fig. 8. Historical structures with dominant grassland and with arable land and dominant lines of trees.

ever, at the present time in Slovakia these areas are not subject to special protection. There is a high risk in the near future, due to abandonment and subsequent succession of woody vegetation and due to urban pressure, that we will witness a decline or even irreversible loss of biodiversity linked to these specific biotopes.

HSAL depend on human activity and specifically on agricultural management. Most of the areas with the present HSAL are situated in regions marginal from economic, demographic and social points of view, and the local inhabitants are not very keen on managing the agricultural landscape because of low yields from the land. Even though the areas of HSAL with dispersed settlement have been preserved in almost the same appearance, the primary agricultural function of the settlements is no longer performed at the same intensity. Cottages and recreational houses have become more and more popular, and as a type of “secondary resettlement” this can mean an impulse for further development of the countryside (Petrovič, 2005). However, this prevents abandoned farmsteads from falling into complete decline and it may eventually benefit regeneration of these small holdings (Huba, 2009).

One of the objectives of the European Landscape Convention is to promote the standardized typology of landscapes, the definition of their cultural-historical potential and standardization of the landscape. This is to be based on characteristic environmental features, land use, culture-historical value and the application of methodology in the typological and individual regionalization of selected landscape segments. The objective of the project entitled “Landscape Typology in Slovakia” prepared by the Slovak Environmental Agency and other institutions, was to draft a hierarchy of classification of the Slovak landscape from the supra-national level to the local level and to work out a classification for individual levels. However, this was not supported by the Slovak Government (Kozová et al., 2008). Historical structures of agricultural

landscape are recognized in landscape types of their high cultural-historical value, and this became a motivation for us to study these structures and to develop their classification.

Traditional historical landscapes are outlined in the Landscape Atlas of the Slovak Republic (Podolák et al., 2002). Several groups of traditionally used cultural landscapes preserved after the period of agricultural intensification are displayed there-in. These include the traditional meadow-pasture landscape, landscape with traditional dispersed settlement, historical landscape with small farm buildings or water mills and historical landscapes of mixed types. These include folk architecture and cultural mosaics. Our classification of HSAL follows the usual classification of the agricultural landscape. Although it investigates into the landscape of vineyards and grasslands, the mosaic of arable land and grasslands and of dispersed settlement, it was deemed necessary for us to proceed in deeper detail. With the help of new modern tools such as the GIS and aerial photography, it was possible to precisely define the distribution, land use and typology of HSAL. This combination with field survey experience enabled us to describe characteristic features of HSAL types and to evaluate their significance for biodiversity and their cultural-historical value.

Results from this HSAL inventory can serve as a valuable data source for further HSAL assessment, and specifically concerning their natural and cultural-historical value, and their further trends and threats. This researched scientific knowledge can support the development of relevant legislation measures for the conservation of the biodiversity and cultural heritage of this precious agricultural landscape. The HSAL database can also be utilized as a valuable source for territorial planning at regional and national levels. It is also of utmost importance for the development of related legislation measures, for research activities and for international cooperation in the protection and management of agricultural landscapes.

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