ECOLOGICAL CHARACTERISTICS OF THE STUDIED FOREST COMMUNITIES OF AN OAK-HORNBEAM TIER IN SW SLOVAKIA

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Abstract

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The paper deals with characterization of the study area with its sampled plots more in details, including geology, climatic conditions, pedological and phytocoenological aspects of the 10 oak-hornbeam forest stands. For 4 seasons we were focused on selected invertebrate groups inhabiting epigeon, mosses and dendrotelmae from the coenological point of view. The study forest stands with 40–100 years of age are situated in 2 orographic units: the Malé Karpaty Mts and Trnavská pahorkatina hills. Corresponding with the 3 recorded forest types (*Carpinion betuli*, *Quercion confertae-cerris*, *Q. pubescentis-petraeae*) we have analysed 3 soil types with different genesis and features: Rendzic Leptosols, Cambisols and Planosols. The studied stands differ in their age, anthropogenous impact and fragmentation (they represent fragmented forests in cultural environment as well as more continuous forest complexes).

Key words: forest ecosystem, oak-hornbeam vegetation tier, climate, pedology, phytocoenology, Malé Karpaty Mts, Trnavská pahorkatina hills, SW Slovakia

Introduction

In 1999–2002 we realised complex coenological research of the selected invertebrate groups (ciliates, naked amoebae, water bears, soil mites, pseudoscorpions, spiders, terrestrial isopods, millipedes, centipedes, ear-wigs, bugs, weevils) in an oak-hornbeam forest ecosystem in SW Slovakia. The presented supplement includes analyses from soil as well as some other microhabitats such as mosses, decaying wood and dendrotelmae, which have not been intensively studied yet.

In the introduction we provide detailed characteristics of the study area with a special emphasis on geology, climate, soils and phytocoenology.

Material and methods

The names of soil types and subtypes are presented according to the Morphogenetic soil classification system of Slovakia (Šály et al., 2000). The other soil analyses refer to the methods by Hraško et al. (1962). The soil samples were obtained in the same depth like the zoological material from fallen leaves and upper humus horizon (epigeon).

The nomenclature of vascular plants is presented according to Ehrendorfer (1973). The phytocoenoses were analysed according to the Central-European Zürich-Montpellier school (Braun-Blanquet, 1964).

Study area

Invertebrate communities of the mentioned forest stands (*Carpinion betuli*, *Quercion confertae-cerris*, *Q. pubescentis-petraeae*) were analysed in southern, central and northern parts of the Malé Karpaty Mts and nearby NW points of Podunajská nížina lowland (Trnavská pahorkatina hills) from Pezinok to Naháč (Fig. 1). We selected 10 following study plots, which were analysed for 4 vegetation periods (1999–2002) from the zoological point of view.

1. **Cajla** (CA), 48°20' N, 17°16' E, GRN (Grid Reference Number of the Databank of the Fauna of Slovakia) 7669c;
2. **Vinosady** (VI), 48°19' N, 17°17' E, GRN 7669d;
3. **Fúgelka** (FU), 48°22' N, 17°19' E, GRN 7669b;
4. **Lindava** (LI), Nature Reserve, 48°22' N, 17°22' E, GRN 7670a;
5. **Horný háj grove** (HH), 48°29' N, 17°27' E, GRN 7570b;
6. **Lošonec–lom quarry** (LL), 48°29' N, 17°23' E, GRN 7570b;
7. **Lošonský háj grove** (LH), Nature Reserve, 48°28' N, 17°24' E, GRN 7570b;
8. **Naháč–Kukovačník** (NA), 48°32' N, 17°31' E, GRN 7471c;
9. **Naháč–Katarínka 1** (NK1), Nature Reserve, 48°33' N, 17°33' E, GRN 7471a;
10. **Naháč–Katarínka 2** (NK2), Nature Reserve, 48°33' N, 17°32' E, GRN 7471a.

The study area of the Malé Karpaty Mts geomorphologically belongs to the subunit of Pezinské Karpaty Mts, being predominantly built by crystalinicum. Its main part is formed by 2 massives: Bratislava massive, built by two mica garnet rocks and Modra massive formed by biotite granodiorite. Their contact zone has been built by crystalic shales, known as Pezinok-Pernek crystalinicum. Except for shales the bedrock consists of biotites phyllites and biotite-garnet mica schist gneisses. This actually occurs at the study sites of Cajla, Vinosady, Fúgelka, Lošonský háj grove, Naháč–Kukovačník, Naháč–Katarínka 1. On north and west the crystalinicum is bordered by a narrow strip of cover Mesozoic unite with the main rocks of Lower Triasic quartzites, siliceous and calcareous sandstones, variegated shales, limestones and dolomites. Carbonates appear on surface at the study sites of Lošonec–lom quarry and Naháč–Katarínka 2. Of Neogene

sediments deposed in Trnavská pahorkatina hills in depression under the slopes of the Malé Karpaty Mts. Pliocene clay and claystone bads, sands and sporadically gravel are the most frequent. Clays occur under the site Lindava, sandstones and gravels are at Horný háj grove (Buday et al., 1962; Maheľ, Cambel, 1972). From the altitudinal point of view the study sites are situated in the hilly zone from 240 to 350 m a.s.l.

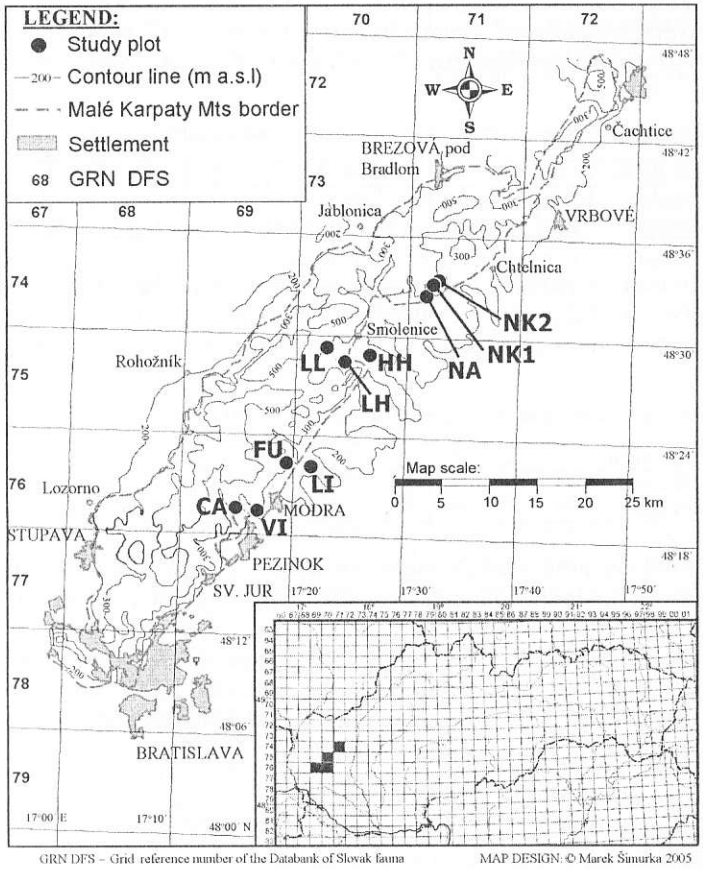

Fig. 1. Study area and position of the ten study plots. Abbreviations of study sites see chapter Study area.

Climate

According to the climatic classification the area of the Malé Karpaty Mts up to the altitude of 400 m a.s.l. belongs to the moderately warm climatic region. The southern

part is classified under the moderately warm and moderately moist climatic district A5 with mild winter, the northern part under moderately warm and moderately moist hilly district B3 (Petrovič, 1972).

The main climatic character of the area refers to perpendicular position towards dominating NW falling winds on both sides of the mountains.

Average annual temperature varies between 7–9 °C, in January 2–3 °C and in July 18–20 °C (Table 1). Average temperatures in vegetation season (April–September) reach 14–15 °C. Average number of summer days (more than 25 °C) is 40–60 annually while there are 30–40 winter days (less than -0,1 °C) a year (Petrovič, 1968; Tarábek, 1980).

Table 1. Average monthly and annual air temperature (°C) in 1931–1960.

Meteorological station	1	2	3	4	5	6	7	8	9	10	11	12	year
Pezinok–Myslenice	1.2	1.3	5.2	10.4	15.4	18.5	20.3	19.5	15.7	10.1	4.5	0.6	10.2
Jaslovské Bohunice	2.1	0.3	4.4	9.7	14.5	17.6	19.2	18.7	14.9	9.6	4.1	0.2	9.2

Long-term average monthly and annual precipitations (1931–1960) from the studied region are given in Table 2. Precipitations of 320 mm refer to the vegetation period (April–September). Snow cover takes 90–100 days annually (Petrovič, 1968).

Table 2. Average monthly and annual precipitations (mm) in 1931–1960.

Meteorological station	1	2	3	4	5	6	7	8	9	10	11	12	year
Pezinok–Myslenice	44	44	36	38	57	68	57	60	37	37	58	54	590
Jaslovské Bohunice	33	33	29	38	57	67	59	62	40	36	52	43	549

Precipitations are influenced by numerous factors, e.g. altitude. These two variables positively correlate (Modra 172 m a.s.l. – 687 mm, Limbach 181 m a.s.l. – 881 mm) (Petrovič, 1968).

Monitoring of long-term averages of temperature and precipitations appears as important for forest vegetation. However for research on invertebrates and their dynamics actual average annual temperatures and precipitations during sampling have to be taken into account. (Tables 3, 4).

Table 3. Average monthly and annual air temperature (°C) in individual years of the research.

Meteorological station	1	2	3	4	5	6	7	8	9	10	11	12	year
Pezinok–Myslenice 1999	-0.2	1	7.2	11.8	15.6	18.2	21.2	18.9	18.1	10.4	3.8	0.5	10.5
Pezinok–Myslenice 2000	-1.3	3.4	6	14	17.4	20.4	18.9	21.7	15.2	12.5	7.9	2.3	11.5
Pezinok–Myslenice 2001	0.4	1.8	5.8	9.9	17.2	17.5	20.9	21.8	13.9	13.1	3.7	-3.7	10.2
Pezinok–Myslenice 2002	0.2	4.4	6.9	10.5	18.1	20.5	22	20.8	15	9.3	7.6	-0.4	11.2
Jaslovské Bohunice 1999	-0.6	-0.1	6.8	11.5	15.2	17.6	21	18.8	18.1	10.1	3.3	-0.5	10.1
Jaslovské Bohunice 2000	-2.7	2.6	5	13.6	16.6	19.5	18.3	21.3	14.7	12.8	7.7	1.6	10.9
Jaslovské Bohunice 2001	0.4	1.8	5.8	8.9	16	16.5	20.5	21.3	13.4	12.6	2.9	-4.6	9.6
Jaslovské Bohunice 2002	-0.9	4	6.2	9.9	17.4	19.4	21.9	20.6	14.3	8.6	7.3	-1.2	10.6

Table 4. Average monthly and annual precipitations (mm) in individual years of the research.

Meteorological station	1	2	3	4	5	6	7	8	9	10	11	12	year
Pezinok–Myslenice 1999	16.7	36.6	24.2	28.7	45.8	74.9	106.5	94.4	67.7	89.2	53.9	42.4	745.5
Pezinok–Myslenice 2000	64.5	60.6	109.3	14.0	27.4	12.1	65.0	47.5	66.7	46.6	56.6	58.0	410.9
Pezinok–Myslenice 2001	14.3	20.9	62.9	29.5	14.6	27.9	82.8	33.5	85.9	14.4	45.0	35.9	467.6
Pezinok–Myslenice 2002	19.1	40.2	31.3	22.0	29.5	56.4	53.8	161.7	40.9	87.8	70.3	74.6	687.6
Jaslovské Bohunice 1999	13.9	40.8	15.9	91.4	39.2	103.2	78.6	49.2	13.0	21.2	45.3	50.5	532.2
Jaslovské Bohunice 2000	38.5	29.4	87.4	11.2	32.7	8.1	66.0	21.4	53.9	32.6	78.9	46.7	506.8
Jaslovské Bohunice 2001	14.3	20.9	62.9	28.1	54.8	34.8	107.8	16.9	109.0	15.3	39.2	35.4	539.5
Jaslovské Bohunice 2002	16.7	36.6	24.2	28.7	45.8	74.9	106.5	94.4	67.7	89.2	53.9	42.4	681.0

According to both the meteorological station data the average annual temperature in 2000 and 2002 (Tables 1, 3) were significantly higher comparing with the long-term average. Annual precipitations appeared significantly higher in the southern part of the study area than the average in 1999 and 2002, in the northern part in 2002 (Tables 2, 4). Therefore the years 1999 and 2002 were warmer and in summertime more humid than averagely. The years 2000 and 2001 were warmer and drier.

Soils

In accordance with the recorded vegetation of *Carpinion betuli*, *Quercion confertae-cerris* and *Q. pubescentis-petraeae* we analysed 3 soil types with different genesis and features. As for their genetic features the development has been influenced by warm climate and carbonate bedrock (Rendzic Leptosols), warm climate and crystalic bedrock, being spatially and successionally impacted by forest stands and increased water overflow in valleys and slopes or surface humidity in plain areas with clays (Cambisols, Planosols). Physical features of soils refer to higher aeration due to numerous stones, gravel and sand and with lack of higher amount of dust as well as clay in soil mater (Rendzic Leptosols, Cambisols). This fact reflects in very high or middle resistance to compaction. Clays situated at the site of Lindava are markedly affected by compaction and are weakly aerated. On the contrary shallow carbonatic soils with a high portion of skelete avoiding compaction are very resistant to compaction (Rendzic Leptosols). This resistance is even enhanced by frequent occurrence of compact rocks on the surface and is supported by presence of carbonates, which provide coagulation of soil mater. Cambisols are partially resistant soils with higher portion of dust and clay components. Planosols have the lowest resistance due to high portion of clay components. Moreover its resistance against compaction is weakened by absence of carbonates. However they have higher content of humus therefore their resistance to trampling is sufficient. The soils usually occur on gentle slopes or in lowlands and are not potentially threatened by water erosion. Only Rendzic Leptosols at Naháč–Katarínka 2 cover steeper SW slope. This fact synerged by occasional rainfalls and remarkable spring streams of rain water on the surface (app. 650 mm of atmospheric rainfalls annually) represents significant and potential threat for soils due to water erosion. It is followed by local soil

Table 5. The survey of pedological variables at the study sites.

Study site/horizont	Soil type by WRB98*, sign.	pH/ H_2O	pH/KCl	% C	% N	C:N	% C_{ox} % humus	SOB	EA	CEC	% BS
								(mval/100 g)			
1. Cajla	Dystric Cambisols KMm[a]										
O-horizon +2–0 cm		4.83	4.21	6.50	0.48	13.54	6.50	18.40	9.10	27.50	67.00
Ao-horizon 0–5 cm		4.29	3.43	2.80	0.20	14.00	4.83	4.20	8.50	12.70	33.00
2. Vinosady	Dystric Cambisols KMm[a]										
O-horizon +2–0 cm		4.48	3.82	8.00	0.67	11.94	7.99	16.00	11.50	27.50	58.00
Ao-horizon 0–5 cm		4.18	3.31	2.55	0.22	11.59	4.40	4.80	9.40	14.50	34.00
3. Fúgelka	Dystric Cambisols KMm[a]										
O-horizon +2–0 cm		3.90	3.37	14.40	1.01	14.26	14.40	12.60	13.10	25.70	49.00
Ao-horizon 0–5 cm		3.76	3.02	3.50	0.29	12.07	6.03	2.60	10.30	12.90	20.00
4. Lindava	Dystric Planosols PGm										
O-horizon +2–0 cm		4.68	3.98	8.40	0.63	13.33	8.39	22.60	12.50	35.10	64.00
A/Bg-horizon 0–5 cm		3.97	3.20	1.80	0.18	10.00	3.10	2.20	11.10	13.30	17.00
5. Horný háj grove	Dystric Cambisols KMma										
O-horizon +2–0 cm		5.00	4.54	9.60	0.73	13.15	9.59	31.80	9.50	41.30	77.00
Ao-horizon 0–5 cm		4.17	3.48	2.30	0.19	12.11	3.97	3.00	8.30	11.30	27.00
6. Lošonec–lom quarry	Rendzic Leptosols RAk										
O-horizon +2–0 cm		6.74	6.14	3.80	0.35	10.86	3.79	22.60	1.80	24.40	93.00
Amc-horizon 0–5 cm		6.55	5.75	2.70	0.29	9.31	4.65	17.40	2.50	19.90	87.00
7. Lošonecký háj grove	Dystric Cambisols KMm[a]										
O-horizon +2–0 cm		4.29	3.54	7.40	0.60	12.33	7.40	15.40	13.70	29.10	53.00
Ao-horizon 0–5 cm		4.37	3.48	3.75	0.31	12.10	6.47	7.40	10.90	18.30	40.00
8. Naháč–Kukovačník	Dystric Cambisols KMm[a]										
O-horizon +2–0 cm		4.18	3.60	7.20	0.53	13.58	7.19	15.40	12.80	28.20	55.00
Ao-horizon 0–5 cm		4.08	3.39	1.80	0.20	9.00	3.10	4.40	9.40	13.80	32.00
9. Naháč–Katarínka 1	Dystric Cambisols KMm[a]										
O-horizon +2–0 cm		4.24	3.68	7.40	0.87	8.51	7.40	19.60	14.90	34.50	57.00
Ao-horizon 0–5 cm		3.94	3.35	1.70	0.17	10.00	2.93	3.00	9.80	12.80	23.00
10. Naháč–Katarínka 2	Rendzic Leptosols RAm										
O-horizon +2–0 cm		6.45	5.90	5.40	0.52	10.38	5.40	49.40	3.00	52.40	94.00
Amc-horizon 0–5 cm		6.37	5.55	3.20	0.35	9.14	5.52	36.20	3.70	39.90	91.00

Explications: * according to comparison in Šály et al. (2000),
SOB – sum of exchangeable bases, EA – exchangeable acidity, CEC – cation exchangeable capacity, BS – base saturation

denudation. Soils with accumulated layers of sediments occur down the hill and in deeper valleys. While in upper parts of slopes we often record shallow to middle deep soils with rocky bedrock in depth of 0.3 to 0.6 m, in lower parts the compact bedrock lies in depth of 2–3 m. Real water erosion effects are slowed down by vegetation cover. Forest with its undergrowth has weaker resistance to water erosion.

Soils particularly developed from crystalic rocks (sites Vinosady, Cajla, Fúgelka, Horný háj grove, Lošonský háj grove, Naháč–Kukovačník, Naháč–Katarínka 1), in 2 cases on carbonates (sites Lošonec–lom quarry, Naháč–Katarínka 2) and once on tertiary clays (site Lindava). The studied natural forest soils contain sufficient amount of humus in a relatively shallow humus (Ao, Amc, Aoq) horizon (2.93–6.47%). However in comparison with farmland this concentration appears low (Table 5). Concentration of Cox is relatively balanced in fallen leaf horizon, the lowest amount of organic matter refers to fallen leaf horizon in Rendzic Leptosols (3.79–5.40%), where leaves are markedly mineralised due to carbonates. In the other soils (Cambisols, Planosols) the carbon concentration in a fallen leaf horizon varies between 6.50–14.40%, what hints at various degree of organic mater decay.

All the studied soils may be considered as significantly anthropized. Many forests covered former vineyards in coline zone, where former vegetation had been destroyed and soils rigoled. At present forests are usually economically exploited what leads to partial damage on soil profile. The Rendzic soil at Naháč–Katarínka 2 was affected by the monastery and a part of the locality has been covered by ruins.

At most of the study sites (7) in communities of *Carpinion betuli* (*Galio sylvaticae-Carpinetum* a *Querco petraeae-Carpinetum*) we recorded Cambisols, which are developed, brown soils, weakly to partially eroded. These soils develop in hillier or even mountainous areas from sloap compact bedrock and have suitable biologically active form of humus in saturated to acid mul. A-horizon reaches thickness of several centimeters. This is an alternation soil with dominant Cambic Bv-horizon under surface, formed in brunification process. Moreover in the study area we recorded District Cambisols, with no more diagnostic horizons under surface. C-horizon represents eroded crystalic rocks or even compact rock. Development of Cambisols is accompanied by acidification leaching, what actually slows down biological circulation of nutrients. Acid and unsaturated District Cambisols occur at Vinosady, Cajla, Fúgelka, Horný háj, Lošonecký háj, Naháč–Kukovačník, Naháč–Katarínka.

Two of the soils at Lošonec–lom quarry and Naháč–Katarínka 2 in communities of *Corno-Quercetum pubescentis* and *Querco petraeae-Carpinetum* are Rendzic Leptosols, being developed on limestone. These soils belong to the category of Rendzic soils with sod pedogenetical process to processes of accumulation and stabilization of humus, hence the soils with Mollic Am-horizon, sometimes even Ochric horizon (Ao) with no more diagnostic horizons (Šály et al., 2000).

According to Němeček et al. (1990) they belong to weakly developed postlitogene soils, which were formed on eroded carbonates with higher content of skeleton (more than 30%). They are indicated by a weak degree of soil profile development and low production potential, which is enhanced by extreme climatic conditions and location on slopes. Content of humus and acidification of soil profile depend on hydrothermic regime. From the physical point of view the soil is well aerated due to frequent

occurrence of stones, gravel and sand. It is very resistant to compaction. In the stand of *Corno-Quercetum pubescentis* (site Naháč–Katarínka 2) we recorded the subtype Rendzic Leptosols (RAm) with no more diagnostic horizons or their indication, with remarkable transformation into C-horizon. In the forest stand of *Querco petraeae-Carpinetum* (site Lošonec–lom quarry) we observed Rendzic Leptosols (RAk) with indication of Cambic Bv-horizon and presence of carbonates. In Rendzic Leptosols the exchangeable pH is weakly acid and they are very saturated. The study site Lošonec–lom quarry (LL) is situated just over the quarry and during working days it is intensively impacted by carbonatic dust, what actually reflects in the highest value of active as well as exchangeable pH in decaying horizon and the highest degree of organic matter decay.

At Lindava we detected Dystric Planosols (PGm) in the community of *Quercetum petraeae-cerris* in deluvial plain. In the depression under the slopes of the Malé Karpaty Mts these soils occur on tertiary clays. A shallow (3 cm) Ochric silicate Aoq-horizon is followed by deeper Bgv-horizon, which is formed under remarkable periodical saturation of soil mater by surface water in horizons with decreased resp. low hydraulic conductibility. Alternation of stagnation and water circulation, reduction and oxidation processes leads to forming colourful horizon with thickness of more than 15 cm. This is a mosaic coloration, alternation of rusty, pale brown and grey colours in the matrix. At the study site we recorded the subtype Dystric Planosols (PGm) with no more diagnostic horizons under surface. The soil is strongly acid, saturated in Aoq/Bg (Table 5).

Vegetation

Mixed forest stands at the 10 study sites in SW the Malé Karpaty Mts and N promontory of the Podunajská nížina lowland – Trnavská pahorkatina hills, occurring in a coline zone at the altitude of 250–350 m a.s.l., may be classified into mesophilous oak-hornbeam forests of *Carpinion betuli* I s s l e r 1931 em. M a y e r 1937 (sites of Vinosady, Cajla, Fúgelka, Horný háj grove, Lošonský háj grove, Lošonec–lom quarry, Naháč–Kukovačník, Naháč–Katarínka 1), subxerothermophilous Balkan mixed forests of *Quercion confertae-cerris* H o r v a t 1954 (Lindava) and oak xerothermophilous submediterranean forests of *Quercion pubescentis-petraeae* B r. - B l. 1931 (Naháč–Katarínka 2).

In the area of the Malé Karpaty Mts and nearby Podunajská nížina lowland the oak-hornbeam forests have been floristically and pedologically differentiated. For all the cases included in the research the oak-hornbeam forests are situated on sandy-loam skeletal mesotrophic to oligotrophic Dystric Cambisols on poor crystalic bedrock (granodiorite). Floristically they are indicated by *Carex pilosa, Galium sylvaticum, G. schultesii, Stellaria holostea, Carpinus betulus, Quercus dalechampii, Pulmonaria officinalis, Symphytum tuberosum* of Carpathian oak-hornbeam forest suballiance *Carici pilosae-Carpinenion betuli* J. et M. M i c h a l k o 1986 (Michalko et al., 1986). Moreover the species spectrum includes many representatives of *Fagetalia* P a w ł. 1928, such as *Galium odoratum, Arum alpinum* ssp. *besserianum, Melica nutans, M. uniflora,*

Asarum europaeum, Bromus benekenii, Dentaria bulbifera, Festuca heterophylla, Cornus mas, Euphorbia polychroma, Tanacetum corymbosum, Pulmonaria obscura, Campanula trachelium, etc.

In warmer and drier habitats the communities of *Carpinion betuli* (Naháč–Kukovačník and Naháč–Katarínka 1) are sporadically enriched in some species of subxerothermophilous oak forests, such as *Quercus cerris, Melittis melissophyllum, Cornus mas, Vicia cassubica, Pulmonaria mollis, Clinopodium vulgare, Carex montana* and *Vincetoxicum hirundinaria*. Domination of *Quercus cerris* in stands of *Carpinion betuli* as well as *Quercion confertae-cerris* is supposed to correspond with human impact in a synergy with good sprouting capacity. In several stands on oligotrophic cambisols acidophilous species, e.g. *Luzula luzuloides, Avenella flexuosa* and *Melampyrum pratense* occur occasionally.

Oak-hornbeam forests in SE part of the Malé Karpaty Mts belong to the communities of *Galio sylvaticae-Carpinetum* O b e r d. 1957 and *Querco petraeae-Carpinetum* S o ó et P ó c s 1957. The associations are not indeed significantly differentiated and are floristically changed as the whole SE part of the Malé Karpaty Mts has been considerably managed (vineyards, economically managed forests). High anthropization has been proved by a big proportion of nitratophilous species (*Alliaria petiolata, Galium aparine, Geranium robertianum, Chaerophyllum temulum, Geum urbanum, Glechoma hirsuta, Lamium maculatum, Urtica dioica, Sambucus nigra, Viola odorata, Mycelis muralis, Fallopia convolvulus, Lapsana communis*, etc.) in all the study sites.

Subxerothermophilous (xerothermophilous) forests with a more significant portion of *Quercus cerris* indicate climatically warm locations and are interacted with ilimerized Luvisols on loess cover (in the study area Dystric Planosols on tertiary clays). The soils are dried up in summer or during intensive droughts. In spring under heavy rains they are humid, loamy and hence heavy, gently acid to acid. Such the conditions have been observed at the site Lindava being situated in Podunajská nížina lowland (geomorphological subunit of Trnavská pahorkatina hills). According to floristic structure and soil type the stand may be classified as Balkan mixed forests of *Quercion confertae-cerris,* which are climatically zone in the continental part of Balkan Peninsula with effect towards Pannonian region and even slopes of W Carpathians. *Quercus cerris* is accompanied by *Q. dalechampii* and sporadically *Acer campestre*. The shrub tier, relatively rich, however poor at damaged phytocoenoses, includes *Ligustrum vulgare, Cornus mas, C. sanguinea, Prunus spinosa, Rosa gallica, Crataegus laevigata, Rhamnus catharticus.* In our case it has been eliminated due to human impact. The undergrowth is formed by *Carex montana, Potentilla alba, Poa pratensis* var. *angustifolia, Pulmonaria mollis, Lathyrus niger, Primula veris, Melittis melissophyllum,* occasionally followed by some species of *Quercion pubescentis-petraeae* B r. - B l. 1931, such as *Festuca rupicola, Hypericum perforatum,* etc. or acidophilous species, e.g. *Veronica officinalis, Luzula luzuloides, L. pilosa, Avenella flexuosa, Genista tinctoria, Silene nutans*. The less depredated phytocoenoses are enriched in some species of mesophilous deciduous forests – *Poa nemoralis, Dactylis polygama, Carpinus betulus,* which are in contact with the Malé Karpaty Mts. All the xerothermophilous forests have been classified into more concipated association of *Quercetum petraeae-cerris* S o ó 1957.

The forest stand at Naháč–Katarínka 2 on the soil subtype of Rendzic Leptosols belong to the group of xerothermophilous submediterranean oak forests (*Quercion pubescentis-petraeae*) which are interacted with warm southern, south-western and south-eastern slopes in hills, on carbonates, dolomites, calcareous conglomerates, flysches and basaltic eruptive rocks. They inhabit extreme forms of surface, such as ridges of mountains and steep slopes.

On carbonates in the Malé Karpaty Mts the communities contact nearby oak-hornbeam forests in fragments up to the altitude of 400 m a.s.l. The stands are dominated by (*Quercus pubescens*), which reaches the height of 5 m as well as *Q. cerris* (8 m maximally). Limetree (*Tilia cordata*) has been planted in Nature Reserve Katarínka right under the monastery of St. Catherine. The trees are also represented by *Acer campestre,* shrubs by *Cornus mas, Crataegus monogyna, Fraxinus excelsior, Viburnum lantana, Euonymus verrucosa, E. europaea* and *Sambucus nigra*. The undergrowth is built by *Buglossoides purpurocaerulea, Pulmonaria mollis* and numerous species of *Festuco-Brometea* B r. -B l. et R. T x. 1943. For the long time the study forest has been anthropically impacted by the nearby monastery and at present by tourism particularly. This obviously correlates with high dominance of nitratophilous species, locally significantly dominating. The xerothermous forest belongs to the association of *Corno-Quercetum pubescentis* J a k u c s et Z ó l y o m i 1958. The community forms a relatively narrow wreath in SE part of the peak. Down the hill on deeper soil and less steep slope it transforms into *Quercetum petraeae-cerris* S o ó 1957.

The study sites with their phytocoenological records

1. The Malé Karpaty Mts, Cajla (CA), SE slope of Malá cajlanská homola hill, 280 m a.s.l.
Oak-hornbeam forest *Galio sylvaticae-Carpinetum,* economically managed forest neighbouring with meadows and vineyards on S and E, from N and W closed forest complexes.
Analysed area in m^2: 400, exp.: S, slope 7°, date: June 6, 2005.
Age of a stand: 80–100 years, average height: 27–30 m, average thickness at chest height: 40 cm, coverness: E_3: 75%, E_2: 2%, E_1: 90%, E_0: 5%.
E_3: *Quercus dalechampii* 5, *Carpinus betulus* +, *Sorbus torminalis* (8 m) subdominant +.
E_2: eliminated artificially, *Acer campestre* +, *Quercus dalechampii* r.
E_1: *Poa nemoralis* 3, *Quercus dalechampii* 3, *Galium odoratum* 2, *Brachypodium sylvaticum* 1, *Melica uniflora* 3, *Acer campestre* +, *Pulmonaria officinalis* +, *Fragaria moschata* +, *Carex pilosa* +, *Galium sylvaticum* +, *Campanula persicifolia* +, *Rhamnus catharticus* +, *Scrophularia nodosa* r, *Melampyrum pratense* +, *Hieracium sabaudum* +, *Tilia platyphyllos* +, *Euonymus verrucosa* +, *Hieracium sylvaticum* 1, *Viola reichenbachiana* +, *Prunus avium* +, *Carpinus betulus* +, *Fraxinus excelsior* +, *Dactylis polygama* +, *Rosa canina* agg. +, *Impatiens parviflora* +, *Rubus fruticosus* agg.+, *Lysimachia nummularia* +, *Viola mirabilis* r, *Geranium robertianum* +, *Galium aparine* +, *Alliaria petiolata* 1, *Impatiens noli-tangere* +, *Mycelis muralis* +, *Galeopsis pubescens* r, *Juglans regia* r, *Lathyrus vernus* +, *Luzula luzuloides* +, *Veronica officinalis* +, *Ranunculus ficaria* 1, *Euphorbia amygdaloides* +, *Geum urbanum* +, *Rubus caesius* 1, *Corydalis solida* +, *Stellaria nemorum* +, *Scilla bifolia* +, *Prunella vulgaris* +, *Hedera helix* +.

2. The Malé Karpaty Mts, Vinosady (VI), NW slope of Kamenica hill, 280 m a.s.l.
Oak-hornbeam forest *Querco petraeae-Carpinetum* variant with *Poa nemoralis,* economically managed forest, former vineyard, neighbouring from W with drier subxerophilous meadows and shrub complexes.
Analysed area in m^2: 400, exp.: NW, slope: 5–7°, date: June 23, 2005.
Age of a stand: 60–80 years, average height: 25–27 m, average thickness at chest height: 35–40 cm, coverness: E_3: 70%, E_2: 30%, E_1: 80%.
E_3: *Quercus dalechampii* 4, *Quercus cerris* +, *Prunus avium* +, *Acer campestre* r.
E_2: *Acer campestre* 2, *Tilia cordata* +, *Ligustrum vulgare* +, *Fraxinus excelsior* +, *Cornus sanguinea* +.
E_1: *Poa nemoralis* 3, *Melica uniflora* 3, *Acer campestre* 2, *Cephalanthera alba* 1, *Quercus dalechampii* 1, *Tilia cordata* +, *Prunus avium* +, *Ligustrum vulgare* +, *Sorbus torminalis* +, *Quercus cerris* +, *Pyrus pyraster* r, *Arum alpinum* ssp. *besserianum* +, *Rhamnus catharticus* +, *Rosa canina* agg. +, *Hieracium sylvaticum* +, *Sedum maximum* +, *Euonymus europaea* +, *Fraxinus excelsior* +, *Hedera helix* +, *Cornus sanguinea* +, *Hieracium sabaudum* +, *Brachypodium sylvaticum* +, *Dactylis polygama* +, *Solidago virgaurea* r, *Lilium martagon* +, *Clinopodium vulgare* +, *Erigeron annuus* subsp. *septentrionalis* +, *Sambucus nigra* +, *Lamium maculatum* 2, *Geranium robertianum* 2, *Alliaria petiolata* 2, *Galium aparine* 1, *Mycelis muralis* +, *Glechoma hirsuta* 1, *Geum urbanum* 1, *Viola odorata* 1, *Fallopia convolvulus* 1, *Anthriscus cerefolium* ssp. *trichosperma* 1, *Chaerophyllum temulum* 1, *Stellaria nemorum* +, *Gagea pratensis* +, *Lamium purpureum* +, *Rubus caesius* +, *Pulmonaria officinalis* +, *Lathyrus vernus* +, *Arabis turrita* +, *Hordelymus europaeus* +, *Corydalis cava* 3, *C. solida* 1, *Scilla bifolia* 1, *Ranunculus ficaria* 1, *Geum urbanum* +, *Allium oleraceum* 1, *Veronica hederifolia* 1, *Pulmonaria mollis* r.

3. The Malé Karpaty Mts, Fúgelka (FU), appr. 3 km NW from the village of Dubová, 350 m a.s.l.
Oak-hornbeam forest *Galio sylvaticae-Carpinetum* facies with *Rubus fruticosus* and *R. hirtus* (oceanic species). Economically exploited forest with appr. 20 year old underplanting of *Acer pseudoplatanus* in lines due to transformation from a low forest to high-trunked forest. There are several older game-keeping trails in the forest. On S in contact with vineyards, on E with road, on N and W with more continuous forest complexes.
Analysed area in m^2: 400, exp.: S, slope: 5°, date: June 23, 2005.
Age of a stand: 80–100 years, average height: 30–35 m, average thickness at chest height: 40 cm, coverness: E_3 80%, E_2: 50%, E_1: 40%, E_0: 3%.

E_3: *Quercus dalechampii* 4, *Prunus avium* +, *Fraxinus excelsior* +, *Acer pseudoplatanus* (8–10 m subdominant) r, *Larix decidua* r.
E_2: *Corylus avellana* +, *Acer pseudoplatanus* 3, *Crataegus monogyna* +, *C. laevigata* r, *Ulmus minor* +, *Rosa canina* agg. +.
E_1: *Ribes uva-crispa* (wild) +, *Melica uniflora* 3, *Poa nemoralis* +, *Cephalanthera alba* +, *Carex pilosa* 1, *Symphytum tuberosum* +, *Viola reichenbachiana* +, *Galium sylvaticum* +, *G. odoratum* 1, *Prunus avium* 1, *Acer pseudoplatanus* 2, *Stachys sylvatica* +, *Scrophularia nodosa* +, *Melampyrum pratense* +, *Avenella flexuosa* +, *Luzula luzuloides* +, *Polygonatum odoratum* +, *Pulmonaria officinalis* +, *Rubus fruticosus* agg. 2, *R. hirtus* 2, *Hieracium sabaudum* +, *Lysimachia punctata* +, *Quercus dalechampii* 2, *Ulmus campestre* 1, *Pyrus communis* r, *Acer platanoides* +, *Fraxinus excelsior* +, *Circaea lutetiana* +, *Dryopteris filix-mas* +, *Athyrium filix-femina* +, *Geranium robertianum* 1, *Urtica dioica* 1, *Galium aparine* 1, *Impatiens noli-tangere* 1, *I. parviflora* 1, *Sambucus nigra* +, *Alliaria petiolata* r, *Ranunculus ficaria* 3, *Euphorbia amygdaloides* +, *Arum alpinum* ssp. *besserianum* +, *Polygonatum odoratum* +, *Glechoma hirsuta* +, *Carex digitata* +, *Lathyrus vernus* +.

4. The Trnavská pahorkatina hills, Lindava (LI), appr. 1 km on E from the village of Píla, nature reserve, 240 m a.s.l.
Oak-hornbeam forest *Quercetum petraeae-cerris* on Dystric Planosols, former economically exploited forest. Large complex of island forest surrounded by fields and road.
Analysed area in m^2: 400, date: June 23, 2005.
Age of a stand: 80–100 years (or even 120 and more), average height: 27–30 m, average thickness at chest height: 44 cm, coverness: E_3: 65%, E_2: 1%, E_1: 80%, E_0: 5%.
E_3: *Q. cerris* 4, *Quercus dalechampii* +.
E_2: eliminated by human impact, *Tilia* x *vulgaris* +, *Ribes uva-crispa* (wild) +,.
E_1: *Melica uniflora* 4, *Poa nemoralis* 1, *Quercus dalechampii* 2, *Q. cerris* 1, *Sorbus aria* +, *Carex montana* 1, *Galium odoratum* 1, *Campanula rapunculus* +, *Festuca rupicola* 1, *Hypericum perforatum* +, *Clinopodium vulgare* +, *Veronica chamaedrys* +, *Rubus fruticosus* agg. 1, *Carpinus betulus* +, *Symphytum tuberosum* +, *Prunus spinosa* r, *Rosa canina* agg. +, *Rhamnus catharticus* +, *Acer campestre* +, *Solidago virgaurea* +, *Cephalanthera alba* +, *Viola reichenbachiana* +, *V. mirabilis* +, *Athyrium filix-femina* r, *Dryopteris filix-mas* +, *Hieracium sylvaticum* +, *Genista tinctoria* 1, *Veronica officinalis* +, *Avenella flexuosa* 1, *Luzula luzuloides* +, *L. pilosa* +, *Silene nutans* 1, *Digitalis grandiflora* +, *Scrophularia nodosa* 1, *Carex divulsa* +, *Geranium robertianum* +, *Galium aparine* +, *Vicia sepium* +, *Fallopia convolvulus* +, *Alliaria petiolata* +, *Impatiens parviflora* 1, *Lapsana communis* 1, *Chaerophyllum temulum* +, *Vincetoxicum hirundinaria* r, *Ajuga reptans* +, *Mycelis muralis* +, *Ranunculus ficaria* 2, *Ajuga reptans* +, *Geum urbanum* +, *Carex pilosa* +, *Cardamine impatiens* +, *Viola alba* +, *Fragaria moschata* +, *Lathyrus vernus* +.

5. The Trnavská pahorkatina hills, Horný háj grove (HH), in the cadastral area of Horné Orešany, 240 m a.s.l.
Oak-hornbeam forest *Querco petraeae-Carpinetum* variant with *Melica uniflora*, economically exploited forest, former vineyard. It forms a larger complex of isolated forest surrounded by vineyards and farmland.
Analysed area in m^2: 400, exp.: W – SW, slope: 5°, date: June 23, 2005.
Age of a stand: 60–80 years, average height: 27–30 m, average thickness at chest height: 40 cm, coverness: E_3: 80%, E_2: 10%, E_1: 75%, E_0: 2%.
E_3: *Quercus cerris* 3, *Carpinus betulus* 2, *Quercus dalechampii* 2, *Fraxinus excelsior* 1, *Tilia cordata* +, *Sorbus torminalis* r, *Prunus avium* r.
E_2: *Tilia cordata* 1, *Sambucus nigra* +, *Sorbus torminalis* +, *Acer campestre* +, *Fraxinus excelsior* +.
E_1: *Melica uniflora* 3, *Lamiastrum galeobdolon* 1, *Fraxinus excelsior* 1, *Quercus cerris* 1, *Acer campestre* +, *Allium ursinum* 3, *Polygonatum multiflorum* +, *Arum alpinum* ssp. *besserianum*+, *Symphytum tuberosum* +, *Tilia cordata* +, *Ligustrum vulgare* +, *Scrophularia nodosa* +, *Viola odorata* 2, *Geum urbanum* +, *Chaerophyllum temulum* 2, *Alliaria petiolata* 3, *Galium aparine* 2, *Impatiens parviflora* 1, *Geranium robertianum* 1, *Mycelis muralis* +, *Fallopia convolvulus* 1, *Sambucus nigra* +, *Mercurialis paxii* +, *Anemone ranunculoides* +, *Gagea pratensis* +, *Euphorbia amygdaloides* +, *Lamium purpureum* 1, *Allium oleraceum* +, *Pulmonaria officinalis* +, *Ajuga reptans* +, *Corydalis cava* 2, *C. solida* 1, *Veronica hederifolia* 3, *Lathyrus vernus* +, *Mercurialis paxii* 1, *Ranunculus ficaria* +, *Isopyrum thalictroides* 1 .

6. The Malé Karpaty Mts, Lošonec–lom quarry (LL), 340 m a.s.l.
Oak-hornbeam forest *Querco petraeae-Carpinetum caricetosum pilosae*, economically exploited forest, intensively and systematically impacted by dust from the quarry, from E neighbouring with mesophilous meadows and pastures.
Analysed area in m^2 400, exp.: NE, slope: 8–10°, date: June 23, 2005.
Age of a stand: 80–100 years, average height: 25 m, average thickness at chest height: 44 cm, coverness: E_3: 65%, E_2: 25%, E_1: 100%, E_0: 5%.
E_3: *Quercus dalechampii* 3, *Quercus cerris* 2.
E_2: *Carpinus betulus* 2, *Crataegus monogyna* 1, *Acer campestre* 1, *Prunus spinosa* +.
E_1: *Melica uniflora* 3, *Galium odoratum* 2, *Carpinus betulus* 1, *Pulmonaria officinalis* 1, *Carex pilosa* 1, *Poa nemoralis* 2, *Dactylis polygama* 1, *Fragaria moschata* +, *Veronica chamaedrys* +, *Hedera helix* +, *Fraxinus excelsior* +, *Quercus cerris* 2, *Lysimachia nummularia* 1, *Quercus dalechampii* 1, *Brachypodium sylvaticum* +, *Hieracium sylvaticum* +, *H. sabaudum* +, *Luzula luzuloides* +, *Melampyrum pratense* +, *Malus sylvatica* +, *Rubus fruticosus* agg. +, *Acer platanoides* +, *Crataegus monogyna* +, *Ajuga reptans* +, *Geum urbanum* 1, *Rosa canina* agg. +, *Sorbus torminalis* +, *Viola reichenbachiana* +, *Lathyrus vernus* +, *Hypericum perforatum* +, *Stachys sylvatica* +, *Polygonatum multiflorum* +, *Scrophularia nodosa* +, *Dentaria bulbifera* +, *Galium aparine* 1, *Alliaria petiolata* 1, *Geranium robertianum* +, *Viola odorata* +, *Impatiens noli-tangere* +, *I. parviflora* 1, *Mercurialis paxii* 1, *Urtica dioica* +, *Mycelis muralis* +,

Anemone ranunculoides +, *Arum alpinum* ssp. *besserianum* +, *Ranunculus ficaria* 2, *Corydalis solida* +, *Rubus caesius* +, *Glechoma hirsuta* +, *Euphorbia amygdaloides* +.

7. The Malé Karpaty Mts, Lošonský háj grove (LH) being situated near the village of Lošonec close to Smolenice in deluvium under the slope, 260 m a.s.l., from 1984 nature reserve

Oak-hornbeam forest *Querco petraeae-Carpinetum caricetosum pilosae*, economically exploited forest, surrounded by closed forest complexes

Analysed area in m^2: 400, exp.: NE, slope 1°, date: June 23, 2005.

Age of a stand: 80–100 years, average height: oaks 25 m, hornbeams 20 m, average thickness at chest height: oaks 44 cm, hornbeams 32 cm, coverness: E_3: 80 %, E_2: 1 %, E_1: 75 %, E_0: 5%.

E_3: *Carpinus betulus* 3, *Quercus dalechampii* 2, *Q. cerris* +.

E_2: eliminated by human impact, *Carpinus betulus* +.

E_1: *Carex pilosa* 3, *Melica uniflora* 2, *Galium odoratum* 3, *Allium ursinum* +, *Quercus dalechampii* 1, *Quercus cerris* 1, *Hedera helix* 2, *Viola reichenbachiana* 2, *Pulmonaria officinalis* 1, *Dentaria bulbifera* 2, *Dactylis polygama* +, *Fraxinus excelsior* +, *Carpinus betulus* +, *Acer platanoides* r, *Oxalis acetosella* +, *Fragaria vesca* +, *Hieracium sylvaticum* +, *Sanicula europaea* +, *Lathyrus vernus* 1, *Acer campestre* +, *Polygonatum multiflorum* +, *Hieracium sabaudum* +, *Rosa canina* agg. r, *Lilium martagon* +, *Stachys sylvatica* +, *Rubus fruticosus* agg. 1, *Campanula persicifolia* +, *Alliaria petiolata* 1, *Geranium robertianum* 1, *Impatiens noli-tangere* 1-2, *Mycelis muralis* +, *Galium aparine* 2, *Impatiens parviflora* 3, *Fallopia convolvulus* +, *Vinca minor* +, *Corydalis solida* +, *Viola alba* +, *Neotia nidus-avis* r, *Crataegus monogyna* 1, *Rubus caesius* +, *Silene nemoralis* +, *Euphorbia amygdaloides* +, *Ranunculus ficaria* 1, *Anemone ranunculoides* +, *Isopyrum thalictroides* 1, *Carex sylvatica* +, *Prunus avium* +.

8. The Malé Karpaty Mts, Naháč–Kukovačník (NA), 300 m a.s.l.

Oak-hornbeam forest *Querco petraeae-Carpinetum* variant with *Melica uniflora*, young isolated stand amongst farmland areas, economically exploited forest.

Analysed area in m^2: 400, exp.: SE–E, slope: 2–3°, date: June 23, 2005.

Age of a stand: 40–60 years, average height: 23 m, average thickness at chest height: 25 cm, coverness: E_3: 75%, E_2: 20%, E_1: 100%, E_0: 1%.

E_3: *Quercus dalechampii* 2, *Q. cerris* 2, *Carpinus betulus* 1, *Prunus avium* r, *Robinia psedacacia* r.

E_2: *Carpinus betulus* +, *Sorbus torminalis* +, *Cornus mas* +, *Cornus saguinea* +, *Corylus avellana* r, *Malus sylvestris* r, *Prunus avium* +, *Sambucus nigra* 1, *Fraxinus excelsior* (underplanted) 1, *Ligustrum vulgare* +, *Acer campestre* +, *Crataegus laevigata* r, *Robinia psedacacia* +.

E_1: *Melica uniflora* 5, *Poa nemoralis* +, *Quercus cerris* 1, *Q. dalechampii* 1, *Prunus avium* +, *Crataegus monogyna* +, *Acer campestre* +, *Galium odoratum* 2, *Polygonatum multiflorum* 1, *Melittis melissophyllum* 1, *Vicia cassubica* +, *Vincetoxicum hirundinaria* +, *Pulmonaria mollis* +, *Galium schultesii* +, *Fragaria moschata* +, *Cornus sanguinea* +,

Malus sylvestris +, *Sorbus torminalis* +, *Campanula trachelium* +, *Carex montana* +, *C. muricata* +, *Rubus fruticosus* agg. 3, *Viola reichenbachiana* +, *Rosa canina* agg. +, *Lilium martagon* +, *Fraxinus excelsior* +, *Geranium robertianum* 1, *Urtica dioica* +, *Sambucus nigra* 2, *Alliaria petiolata* +, *Arum alpinum* ssp. *besserianum* 1, *Geum urbanum* +, *Viola odorata* +, *Chelidonium majus* +, *Robinia psedacacia* +, *Allium oleraceum* +, *A. ursinum* 1, *Symphytum tuberosum* +, *Corydalis solida* +, *Ranunculus ficaria* +, *Veronica hederifolia* 1.

9. The Malé Karpaty Mts, Naháč–Katarínka 1 (NK1), 340 m a.s.l.

Oak-hornbeam forest *Querco petraeae-Carpinetum*, economically exploited forest, nature reserve, surrounded by closed forest complexes.

Analysed area in m^2: 400, exp.: NW, slope 3–5°, date: June 23, 2005.

Age of a stand: 40–60 rokov, average height: 17 m, average thickness at chest height: 22 cm, coverness: E_3: 80%, E_2: 1%, E_1: 80%, E_0: 3%.

E_3: *Quercus dalechampii* 4, *Carpinus betulus* 2, *Quercus cerris* +, *Prunus avium* +, *Fagus sylvatica* r. Tree tier consists of two parts: the main stratum with *Quercus dalechampii* and *Carpinus betulus* under it (coverness of 40 %).

E_2: *Carpinus betulus* 1, *Sorbus torminalis* +, *Cornus mas* +, *Crataegus monogyna* +.

E_1: *Poa nemoralis* 1, *Galium odoratum* 2, *Quercus dalechampii* 2, *Q. cerris* 1, *Carex pilosa* +, *Pulmonaria officinalis* +, *Lathyrus vernus* +, *Crataegus monogyna* +, *Prunus avium* +, *Malus sylvestris* +, *Melittis melissophyllum* +, *Polygonatum multiflorum* +, *Clinopodium vulgare* +, *Fragaria moschata* +, *Campanula trachelium* +, *Hieracium sabaudum* +, *Vincetoxicum hirundinaria* +, *Euphorbia amygdaloides* +, *Ligustrum vulgare* +, *Euonymus europaea* +, *Acer campestre* +, *Dryopteris filix-mas* +, *Sorbus domestica* r, *Rosa canina* agg. +, *Viola reichenbachiana* +, *V. riviniana* r, *Rubus fruticosus* agg. +, *Vicia cassubica* +, *Lilium martagon* +, *Festuca gigantea* +, *Scrophularia nodosa* +, *Ajuga reptans* +, *Carex muricata* +, *Circaea lutetiana* +, *Acer platanoides* juv. +, *Urtica dioica* +, *Impatiens parviflora* +, *Alliaria petiolata* +, *Fallopia convolvulus* +, *Geum urbanum* +, *Mycelis muralis* +, *Geranium robertianum* +, *Sambucus ebulus* +, *Allium ursinum* 1, *Neotia nidus-avis* r, *Arum alpinum* ssp. *besserianum* +, *Ranunculus ficaria* 1, *Corydalis solida* 1, *Gagea lutea* +.

10. The Malé Karpaty Mts, Naháč–Katarínka 2 (NK2), old forest stand under the monastery ruins, nature reserve, 320 m a.s.l.

Xerothermophilous oak forest *Corno-Quercetum pubescentis* on the top of the hill, forming a wreath.

Analysed area in m^2: 400, exp. SE, slope: 45°, date: July 18, 2005.

Age of a stand: 80–100 years, average height: 5–8 m, average thickness at chest height: 20 cm, coverness: E_3: 45%, E_2: 35%, E_1: 90%, E_0: 5%.

E_3: *Quercus pubescens* 3, *Q. cerris* 1, *Tilia cordata* (culture) +, *Acer campestre* +.

E_2: *Crataegus monogyna* 2, *Cornus mas* +, *Tilia cordata* +, *Fraxinus excelsior* +, *Viburnum lantana* +, *Euonymus verrucosa* 1, *E. europaea* +, *Acer campestre* +, *Sambucus nigra* +.

E_1: *Buglossoides purpurocaerulea* 2, *Melica uniflora* 3, *Cornus mas* +, *Ligustrum vulgare* 2, *Brachypodium pinnatum* 1, *Euonymus verrucosa* 1, *Viola hirta* +, *V. mirabilis* 1, V. odorata +, *Fragaria viridis* +, *Festuca valesiaca* 2, *Anthericum ramosum* 1, *Coronilla varia* 1, *Poa pratensis* var. *angustifolia* +, *Verbascum austriacum* +, *Euphorbia cyparissias* +, *Stachys recta* +, *Teucrium chamaedrys* 1, *Sedum maximum* +, *Achillea collina* 1, *Hypericum perforatum* +, *Clinopodium vulgare* 1, *Vincetoxicum hirundinaria* +, *Inula conyza* +, *Pulmonaria mollis* +, *P. officinalis* +, *Alliaria petiolata* 3, *Urtica dioica* +, *Galium odoratum* 1, *Euonymus europaea* +, *Geranium robertianum* 1, *Geum urbanum* 1, *Corydalis solida* 2, *Arum maculatum* ssp. *besserianum* 1, *Ranunculus ficaria* +, *Allium flavum* 1, *Gagea pratensis* +, *Campanula trachelium* +, *Cardaminopsis arenosa* r, *Veronica hederifolia* 1, *Centaurea stoebe* +, *Seseli osseum* +, *Erophila verna* +, *Sanguisorba minor* +, *Mercurialis paxii* 1, *Anemone ranunculoides* +, *Muscari comosum* +, *Potentilla arenaria* +, *Lathyrus vernus* +.

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V práci podávame podrobnejšiu ekologickú charakteristiku skúmaného územia (vrátane geológie, klimatických pomerov, pedológie a fytocenológie). Na 10 študijných plochách sme počas 4 vegetačných sezón (1999–2002) realizovali komplexný synekologický výskum vybraných skupín bezstavovcov v epigeóne, v odumretom dreve v rôznom štádiu rozkladu, v machoch, v dendrotelmách. Študované lesné porasty veku 40–100 rokov sa nachádzajú v orografických celkoch Malé Karpaty a Trnavská pahorkatina. Zhodne s tromi zistenými typmi dubovo-hrabových (*Carpinion betuli*), dubovo-cerových (*Quercion confertae-cerris*) a xerotermofilných dubových lesov (*Q. pubescentis-petraeae*) sme analyzovali tri rôzne pôdne typy vyznačujúce sa odlišnou genézou a vlastnosťami: redziny, kambizeme a pseudogleje. Študované porasty sa líšia vekom, mierou antropického vplyvu a mierou fragmentácie. Reprezentujú jednak lesné fragmenty v kultúrnej krajine, ako aj súvislejšie lesné komplexy.