

## BEETLES (COLEOPTERA) OF THE ABANDONED PASTURE NEAR THE VILLAGE OF MALÉ KRŠTEŇANY (SLOVAKIA)

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**Franc, V., Fašanga, M:** Chrobáky (Coleoptera) opusteného pasienku pri obci Malé Kršteňany (Slovensko)

**Abstrakt:** Drieňový vrch je najjužnejším výbežkom Strážovských vrchov – od tohto orografického celku ho oddeluje dolina riečky Nitrica. Územie je značne antropicky ovplyvnené: V minulosti to bolo masívne odlesnenie a poľnohospodárske využívanie (hlavne ako pasienky), dnes je to najmä ľažobná činost' (niekoľko kameňolomov). Celé územie je nechránené; výnimkou je len menšia PR Veľký vrch, vyhlásená roku 1967 na ploche 47,6 ha. Západne od rezervácie, hned' nad už zčasti nefunkčným kameňolomom, je opustený pasienok, kde prebieha intenzívna sukcesia, na najteplejších stanovištiach je proces pomalší. V priebehu vegetačnej sezóny 2015 sme na tomto území realizovali výskum spoločenstiev chrobákov. I keď ide o územie sekundárneho, antropogénneho charakteru, ktoré obkolesuje náhradný lesný porast (vek do 80 rokov) s dominanciou dubov, boli tu zistené niektoré vzácne druhy, ktorých optimum je v biotopoch blížiacich sa ku klimaxovému štadiu. Patria k nim napr. *Satrapes sartorii*, *Hylis foveicollis*, *Isorhipis melasoides*, *Ochina latreillei*, *Ancyriona japonica*, *Tilloidea unifasciata*, *Bothrideres bipunctatus* a *Choragus sheppardi*. Pomerne bohaté spoločenstvo chrobákov na tomto nepôvodnom, ale určite teplom a pomerne pestrom biotope potvrzuje, že názory odborníkov na klimax, najmä tie konzervatívnejšie, vyžadujú istú revíziu a komplexné pohľady modernej ekológie. Domnievame sa, že už niektoré dielčie štadiá sukcesného procesu možno interpretovať ako „parciálne klimaxové stupne“ smerujúce ku konečnej štruktúre usporiadania bioty. „Konečná“ štadium klimaxu pritom nepredstavuje konečný a konštantný stav, ale naopak, proces veľmi dynamický a premenlivý.

**Kľúčové slová:** Malé Kršteňany, opustený pasienok, chrobáky, Coleoptera, sukcesia

### INTRODUCTION

Our research site is located on the SE slope of the hill of Drieňový vrch (cadaster of the village of Malé Kršteňany). It is the southernmost edge of the Strážovské vrchy Mts, separated from the central massif by the river flow Nitrica. This area is considerably influenced by human activity: In the past, it was massive deforestation and agricultural use (mainly as pasture), recently it is mainly mining activities (several quarries). The whole area is out of the territorial protection; with the exception of the little Nature reserve «Veľký vrch», surrounded by two quarries, the left one is more-or-less abandoned. In the past, this area was used mainly for grazing, but this is currently very limited. Our research site is an abandoned pasture and therefore ecological succession is carried out intensively here. Forgotten after-use areas (abandoned quarries, pastures, industrial sites) are usually considered

to be „sterile“ and unattractive for zoological research, but this may not always correspond to reality. Even in our research site we have carried out several rare and surprising findings. We would like to present the results of our research in this paper.

## MATERIAL AND METHODS

Our study area is west of the reserve «Vel'ký vrch», above the more-or-less abandoned quarry (fig. 1).

Coordinates of the centre of the research site:  $48^{\circ} 38' 49.41''$  N,  $18^{\circ} 26' 44.37''$  E, the altitude 270 – 385 m. Research of beetles has been carried out during vegetation season 2015 and in 1 sampling excursion in March 2017. We applied current methods of sampling, especially sifting of leaf litter and detritus, sweeping the vegetation and shaking down the beetles from tree branches. We also dealt with individual exploration under the bark and in rotten wood of old trunks and stumps. We took merely a small number of individuals, easily identifiable species were mostly noted down only. The beetles (well-known ones) were identified according the key by BALTHASAR (1957); and we used additional identification keys and specialised websites, of course.

Several documented species are often cited in various Red Lists of European countries. Later (tab. 1) will be evaluated and compared their ecosozological status according to the following Red Lists: the Red List of Slovakia (HOLECOVÁ, FRANC, 2001), Czech Republic (FARKAČ et al., 2005), Austria (JÄCH, 1994), Poland (PAWŁOWSKI et al., 2002) and Germany (GEISER et al., 1998). Ecological circumstances of notable



Fig. 1. Our research site above the quarry (red line), green line indicates NR «Vel'ký vrch»

records (symbol „◀“ in tab. 1) will be commented later. The further old and undated records will be not mentioned. Coordinates of the sites are added only in the case of thoroughly localised records. The code DFS (Databank of Fauna of Slovakia) is cited only in several inaccurately mentioned records. Additional data, if possible, are listed in chronological order.

## RESULTS AND DISCUSSION

1 *Satrapes sartorii* – in a colony of *Tetramorium caespitum* under the stone in the warmest place of the former pasture (overgrown karst steppe). A very rare Ponto-Mediterranean species, known only from a few old pre-war records from Čachtice, Slovak Karst Reserve, and the surroundings of Banská Bystrica (lgt. J. Roubal, coll. Slov. nat. museum, Bratislava). Old record from 40s is also known from Nature reserve (later only „NR“) Devínska Kobyla, L. Korbel lgt. (MAJZLAN, 2001). Only the following further recent records are available:

The village of Belina ( $48^{\circ} 14' 49.16''$  N,  $19^{\circ} 51' 31.71''$  E; 252 m), in the colony of *Tetramorium caespitum* in an eolian sandy grassland 10th April 1993 (FRANC, 1995); the village of Horné Vestenice ( $48^{\circ} 43' 21.07''$  N,  $18^{\circ} 25' 36.49''$  E; 450 m), in the colony of *Tetramorium caespitum* in a xerothermic rocky slope May 2, 1993; Nitrické vrchy Mts – Stredná dolina valley ( $48^{\circ} 43' 31.45''$  N,  $18^{\circ} 22' 29.15''$  E; 409 m), the same circumstances April 20, 2003 (FRANC, 2004); Malé Karpaty Mts – Višňová (DFS 7173) May 22, 1998, P. Bezděčka lgt. (HLAVÁČ, LACKNER, 1998); the townlet of Dolné Vestenice – Záviničie (E  $18^{\circ} 23' 17''$ , N  $48^{\circ} 42' 01''$ ; 230 m) April 2001 (MAJZLAN, 2009a).

2 *Leiodes cinnamomeus* – swept from the vegetation at a forest edge during evening. A scattered and scarce species of open forests and edges, larvae are living in underground fungi from the family Tuberaceae.

3 *Euryusa sinuata* – in the colony of *Lasius brunneus* under the bark of damaged oak trunk. A rare species of warmer forests, it indicates the well-preserved environments, like the preceding one.

4 *Ocypterus mus* – in the leaf litter of open oak grove. A scattered and scarce species of warmer habitats, formerly had been ranked among very rare species (ROUBAL, 1936; SMETANA, 1958), nevertheless it seems to be that its abundance is recently markedly increasing (perhaps due to the global warming). ŠUSTEK (1977) mentions several records from southern Moravia and Slovakia, including semi-natural and disturbed forest and ecotone habitats; and he notes that it is actually more abundant than expected. New records are available even from clearly anthropogenous post-industrial habitat: nickel leach dump near the town of Sered' ( $48^{\circ} 16' 32.00''$  N,  $17^{\circ} 44' 0.04''$  E; 125 m), pitfall traps, 2010 – 2011, 3 specimens (MAJZLAN, MAJZLAN, 2011). Note: Post-industrial habitats are mostly considered to be unattractive and „sterile“, but this may not always correspond to reality – they may be (including a wide scale of starting and following succession stages) interesting and remarkable refuges for a lot of rare and declining species of insects and other animals (TROPEK, ŘEHOUNEK, 2011).

Table 1. Beetles (Coleoptera) of the abandoned pasture near the village of Malé Kršteňany

Family / Species	Codes of rec.	Thermo-prefer.	Originality of habitat	Ecosozological status				
				Sk	Cz	A	Pl	G
<b>Carabidae</b>								
<i>Amara convexior</i> Stephens, 1828	D	T M	C SN					
<i>Amara municipalis</i> (Duftschmid, 1812)	I	T	C					
<i>Amara nitida</i> Sturm, 1825	D	T M	C SN					VU
<i>Amara similata</i> (Gyllenhal, 1810)	C	T M	C SN					
<i>Calathus erratus</i> (C.R. Sahlberg, 1827)	H	T	C SN					
<i>Cicindela campestris</i> Linnaeus, 1758	C	T M	C SN D					
<i>Demetrias atricapillus</i> (Linnaeus, 1758)	E	T	C SN					
<i>Dromius quadrimaculatus</i> (Linnaeus, 1758)	G	M	C SN					
<i>Harpalus [= Pseudoophonus] rufipes</i> (De Geer, 1774)	F	T M	C SN D					
<i>Harpalus affinis</i> (Schrank, 1781)	C	T M	C SN					
<i>Harpalus honestus</i> (Duftschmid, 1812)	D	T M O	C SN					
<i>Harpalus tardus</i> (Panzer, 1797)	D	T M	C SN D					
<i>Lebia cruxminor</i> (Linnaeus, 1758)	B	T	C SN					VU
<i>Microlestes minutulus</i> (Goeze, 1777)	C	T M	C SN					
<i>Molops piceus</i> (Panzer, 1793)	C J	M	C SN					
<i>Nebria brevicollis</i> (Fabricius, 1792)	H	T M	C SN					
<i>Synuchus vivalis</i> (Illiger, 1798)	G	T M	C SN D					
<b>Histeridae</b>								
<i>Margarinotus [= Hister] terricola</i> (Marsham, 1824)	E	T	C SN					
<i>Paromalus parallelepipedus</i> (Herbst, 1792)	G	M	C SN					
<i>Satrapes sartorii</i> (Redtenbacher, 1858) <sup>1</sup>	C	T	C	EN	EN	??	ø	
<b>Leiodidae</b>								
<i>Agathidium varians</i> (Beck, 1817)	E	M	C SN					
<i>Anisotoma humeralis</i> (Fabricius, 1792)	D	M	C SN					
<i>Choleva cisteloides</i> (Frölich, 1799)	I	M	C SN D					
<i>Leiodes cinnamomeus</i> (Panzer, 1793) <sup>12</sup>	I	M	C SN A	VU				VU
<i>Nargus brunneus</i> (Sturm, 1839)	I	T	C SN					
<b>Scydmaenidae</b>								
<i>Scydmaenus hellwigi</i> (Herbst, 1792)	G	T M	C SN A					VU
<b>Staphylinidae</b>								
<i>Aleochara bipunctata</i> (Olivier, 1795)	I	T M	C SN D					
<i>Bolitobius cingulatus</i> Mannerheim, 1831	J	T M	C SN					

Tab. 1 continued 1

Family / Species	Codes of rec.	Thermo- prefer.	Originality of habitat	Ecosozological status				
				Sk	Cz	A	Pl	G
<i>Cypha longicornis</i> (Paykull, 1800)	I	T M	C SN					
<i>Elonium striatum</i> (Fabricius, 1792)	B	T M	S N D A					
<i>Euryusa sinuata</i> Erichson, 1837 <sup>13</sup>	G	T M O	C SN		VU		VU	
<i>Falagrioma thoracica</i> (Stephens, 1832)	G	T M	C S N D					
<i>Medon fusculus</i> (Mannerheim, 1830)	F	T M O	C SN					
<i>Ocypus mus</i> (Brullé, 1832) <sup>14</sup>	G	T	C SN		VU			
<i>Othius punctulatus</i> (Goeze, 1777)	E	T M (O)	C SN					
<i>Philonthus carbonarius</i> (Gravenhorst, 1802) [= <i>varius</i> (Gyllenhal, 1810)]	C	M	C S N D					
<i>Philonthus decorus</i> (Gravenhorst, 1802)	H	M	C SN					
<i>Philonthus fimetarius</i> (Gravenhorst, 1802)	D	T M	C S N D A					
<i>Philonthus fuscipennis</i> (Manerheim, 1830)	J	M	C S N D					
<i>Platydracus chalcocephalus</i> (Fabricius, 1801)	D	T M	C SN					
<i>Quedius cruentus</i> (Olivier, 1795)	D F	M	C SN					
<i>Quedius nemoralis</i> Baudi, 1848	G	T M (O)	C S N D					
<i>Quedius ochripennis</i> (Ménétriers, 1832)	F	T M	C SN					
<i>Rugilus rufipes</i> Germar, 1836	D	T M	C SN					
<b>Pselaphidae</b>								
<i>Claviger testaceus</i> Preyssler, 1790	C	T M	C SN					
<i>Tyrus mucronatus</i> (Panzer, 1805)	G	T M O	C SN				VU	
<b>Lucanidae</b>								
§ <i>Lucanus cervus</i> (Linnaeus, 1758) <sup>15</sup>	D	T M	C SN	LC	NT	EN	EN	EN
<i>Platycerus caraboides</i> (Linnaeus, 1758)	D E	M	C SN		NT			
<b>Scarabaeidae</b>								
<i>Amphimallon solstitiale</i> (Linnaeus, 1758)	F	T M	C SN					
<i>Aphodius ater</i> (De Geer, 1774)	D	M	C SN					
<i>Aphodius conspurcatus</i> (Linnaeus, 1758)	G	T M	C SN			CR		
<i>Aphodius consputus</i> (Creutzer, 1799)	D	T M	C SN	VU		EN		EN
<i>Aphodius erraticus</i> (Linnaeus, 1758)	E	T M	C S N D					
<i>Aphodius foetidus</i> (Herbst, 1783)	I	M	C SN			EN		
<i>Aphodius fossor</i> (Linnaeus, 1758)	E	T M O	C S N D					
<i>Aphodius haemorrhoidalis</i> (Linnaeus, 1758)	D	T M	C SN					
<i>Aphodius lugens</i> (Creutzer, 1799)	G	T	C SN	VU	EN		EN	

Tab. 1 continued 2

<b>Family / Species</b>	Codes of rec.	Thermo- prefer.	Originality of habitat	Ecosozological status				
				Sk	Cz	A	Pl	G
<i>Aphodius luridus</i> (Fabricius, 1775)	D	T M	C SN D					
<i>Aphodius sticticus</i> (Panzer, 1798)	D	T M	C SN					
<i>Cetonia aurata</i> (Linnaeus, 1758)	D E	T M	C SN D					
<i>Hoplia praticola</i> Duftschmid, 1805	D	T	C SN			EN	NT	VU
<i>Miltotragus [= Rhizotrogus] vernus</i> (Germar, 1823)	E	T	C SN			VU		RE
<i>Onthophagus fracticornis</i> (Preyssler, 1790)	G	T M	C SN					
<i>Onthophagus taurus</i> (Schreber, 1759) <sup>¶6</sup>	E	T	C SN		VU	CR	?	VU
<i>Protaetia [= Potosia] cuprea</i> (Fabricius, 1775)	G E	T M	C SN					
§ <i>Sisyphus schaefferi</i> (Linnaeus, 1758) <sup>¶7</sup>	C	T	C	LR	NT	EN	RE	EN
<i>Tropinota hirta</i> (Poda, 1761)	C	T M	C SN			EN		VU
<i>Trypocopris [= Geotrupes] vernalis</i> (Linnaeus, 1758)	B C D	M	C SN					
<b>Byrrhidae</b>								
<i>Simplocaria semistriata</i> (Fabricius, 1794)	E	T M	C SN					
<b>Buprestidae</b>								
<i>Anthaxia cichorii</i> (Olivier, 1790) <sup>¶8</sup>	F	T	C SN		RE <sup>1</sup>	CR	RE <sup>1</sup>	RE <sup>1</sup>
<i>Anthaxia fulgurans</i> (Schrank, 1789)	E	T	C SN			NT		CR
<i>Anthaxia nitidula</i> (Linnaeus, 1758)	D E	T M	C SN					
<i>Anthaxia salicis</i> (Fabricius, 1776)	D	T	C SN			NT		VU
<i>Anthaxia similis</i> (Saunders, 1871)	E	T M	C SN D					
<i>Trachys fragariae</i> Brisout, 1874	F	T	C			VU		VU
<b>Elateridae</b>								
<i>Agriotes pilosellus</i> (Schonherr, 1817)	G	T M	C SN					
<i>Ampedus sinuatus</i> Germar, 1844	F	T M	C SN			VU		EN
<i>Athous bicolor</i> (Goeze, 1777)	E	T	C SN					
<i>Calambus bipustulatus</i> (Linaeus, 1767)	E	T M	C SN			NT		
<i>Cardiophorus ruficollis</i> (Linnaeus, 1758)	E	T M	C SN					VU
<i>Dicronychus equiseti</i> (Herbst, 1784)	E	T	C SN			VU		
<i>Hemicrepidius [= Athous] hirtus</i> (Herbst, 1784)	G	M	C SN					
<i>Pheletes [= Limonius] aeneoniger</i> (De Geer, 1774)	D	M	C SN					
<i>Prosternon tessellatum</i> (Linnaeus, 1758)	F	T M	C SN A					
<b>Eucnemidae (Melasidae)</b>								
<i>Hylis foveicollis</i> (Thomson, 1874)	G	T M	C	VU	EN	EN		

Tab. 1 continued 3

Family / Species	Codes of rec.	Thermo- prefer.	Originality of habitat	Ecosozological status				
				Sk	Cz	A	Pl	G
<i>Isorhipis melasoides</i> (Laporte de Castelnau, 1835) <sup>¶9</sup>	F	T M	C	VU	EN	EN		EN
<i>Melasis buprestoides</i> (Linnaeus, 1761)	E	T M	C SN		NT			
<b>Lycidae</b>								
<i>Lygistopterus sanguineus</i> (Linnaeus, 1758)	D	T M	C S N D					
<b>Lampyridae</b>								
<i>Lamprohiza splendidula</i> (Linnaeus, 1767)	G	M	C S N D					
<b>Cantharidae</b>								
<i>Cantharis decipiens</i> Baudi, 1871	B	T	C SN					
<i>Cantharis lateralis</i> Linnaeus, 1758	G	T M	C SN					
<i>Cantharis rustica</i> Fallen, 1807	B	M	C S N A					
<i>Rhagonycha lutea</i> (O. F. Müller, 1764)	G	T M	C SN					
<i>Rhagonycha translucida</i> (Krynický, 1832)	F	M	C SN					
<b>Bostrichidae</b>								
<i>Xylopertha retusa</i> (Olivier, 1790)	G	T	C SN					
<b>Anobiidae</b>								
<i>Ernobius mollis</i> (Linnaeus, 1758)	E	M	C SN					
<i>Gastrallus immarginatus</i> (P. W. J. Müller, 1821)	F	T	C				DD	VU
<i>Gastrallus laevigatus</i> (Olivier, 1790)	G	T	C				DD	EN
<i>Ochina latreillei</i> (Bonelli, 1809) <sup>¶10</sup>	E	T	C	VU	CR	?	ø	CR
<i>Oligomerus brunneus</i> (Olivier, 1790)	G	T M	C SN					VU
<i>Priobium carpini</i> (Herbst, 1793)	G	T M	C SN					
<i>Ptinomorphus imperialis</i> (Linnaeus, 1767)	E	T M	C SN					
<i>Xestobium rufovillosum</i> (De Geer, 1774)	G	T M	C SN					
<i>Xyletinus ater</i> (Creutzer, 1796)	E	T M	C SN					
<i>Xyletinus laticollis</i> (Duftschmid, 1825)	E	T M	C SN					VU
<i>Ptinomorphus imperialis</i> (Linnaeus, 1767)	E	T M	C SN					
<i>Xestobium rufovillosum</i> (De Geer, 1774)	G	T M	C SN					
<i>Xyletinus ater</i> (Creutzer, 1796)	E	T M	C SN					
<i>Xyletinus laticollis</i> (Duftschmid, 1825)	E	T M	C SN					VU
<b>Ptinidae</b>								
<i>Ptinus bicinctus</i> Sturm, 1837	D	T M	C SN					VU
<i>Ptinus pilosus</i> P. W. J. Müller, 1821	E	T M	C SN					VU
<i>Ptinus sexpunctatus</i> Panzer, 1789	E	T	C SN				VU	VU

Tab. 1 continued 4

<b>Family / Species</b>	Codes of rec.	Thermo- prefer.	Originality of habitat	Ecosozological status				
				Sk	Cz	A	Pl	G
<b>Trogositidae</b>								
<i>Ancyrona japonica</i> (Reitter, 1889) <sup>¶11</sup>	E	T	C SN	VU	ø	ø +	ø	ø
<i>Tenebroides fuscus</i> (Goeze, 1777)	J	T M	C SN					EN
<i>Thymalus limbatus</i> (Fabricius, 1787)	C G	T M	C SN					VU
<b>Cleridae</b>								
<i>Clerus mutillarius</i> Fabricius, 1775	C	T M	C SN		NT		RE	CR
<i>Opilo mollis</i> (Linnaeus, 1758)	G	M	C SN					
<i>Thanasimus formicarius</i> (Linnaeus, 1758)	G	M O	C S N D					
<i>Tilloidea unifasciata</i> (Fabricius, 1787)	E	T	C SN		VU		DD	EN
<b>Dasytidae</b>								
<i>Aplocnemus impressus</i> (Marsham, 1802)	E	T M	C SN					
<i>Dasytes aeratus</i> Stephens, 1829	B	T M	C SN					
<i>Dasytes plumbeus</i> (O. F. Müller, 1776)	F	T M	C SN					
<b>Malachiidae</b>								
<i>Anthocomus equestris</i> (Fabricius, 1781)	D	T M	C SN					
<i>Axinotarsus marginalis</i> (Laporte de Castelnau, 1840)	F	T M	C SN					
<i>Axinotarsus ruficollis</i> (Olivier, 1790)	F	T M	C SN					
<i>Hypebaeus flavipes</i> (Fabricius, 1787)	G	M	C SN					VU
<b>Phalacridae</b>								
<i>Olibrus affinis</i> (Sturm, 1807)	C	T M	C SN					
<i>Stilbus testaceus</i> (Panzer, 1797)	E	T M	C SN					
<b>Cucujidae (Laemophloeidae)</b>								
<i>Notolaemus [= Laemophloeus] castaneus</i> (Erichson, 1845)	F	T M	C SN		VU		CR	
<b>Erotylidae</b>								
<i>Triplax lepida</i> Faldermann, 1835 <sup>¶12</sup>	D	T	C SN		EN	VU	DD	EN
<i>Triplax rufipes</i> (Fabricius, 1775)	F	T	C SN		VU			CR
<b>Bothrideridae</b>								
<i>Bothrideres bipunctatus</i> (Gmelin, 1790) <sup>¶13</sup> [= <i>contractus</i> (Fabricius, 1792)]	E	T M	C	NT	EN	EN	EN	CR
<b>Endomychidae</b>								
<i>Mycetaea subterranea</i> (Fabricius, 1801)	D	T M O	C SN					
<b>Coccinellidae</b>								
<i>Adalia decempunctata</i> (Linnaeus, 1758)	C	T M	C S N D					
<i>Chilocorus bipustulatus</i> (Linnaeus, 1758)	G	T M	C S N D					
<i>Coccinella septempunctata</i> Linnaeus, 1758	A	T M O	C S N D A					

Tab. 1 continued 5

<b>Family / Species</b>	Codes of rec.	Thermo- prefer.	Originality of habitat	Ecosozological status				
				Sk	Cz	A	Pl	G
<i>Coccinulla quatuordecimpustulata</i> (Linnaeus, 1758)	D	T M	C S N D					
<i>Harmonia axyridis</i> Pallas, 1773	B C E	T M O	C S N D A					
<i>Hippodamia variegata</i> Goeze, 1777	B	T M	C S N D					
<i>Scymnus interruptus</i> (Goeze, 1777)	G H	T M	C S N D					VU
<i>Scymnus schmidti</i> Fürsch, 1958	D	T	C S N					
<i>Vibidia duodecimguttata</i> (Poda, 1761)	J	T M	C S N D					VU
<b>Colydidae (Zopheridae)</b>								
<i>Bitoma crenata</i> (Fabricius, 1775)	C E	T M	C S N					
<i>Coxelus pictus</i> (Sturm, 1807)	E	M	C S N				EN	CR
<b>Mycetophagidae</b>								
<i>Litargus connexus</i> (Geoffroy, 1785)	B	T M	C S N					
<b>Melandryidae</b>								
<i>Abdera quadrifasciata</i> (Curtis, 1829)	E	M	C			CR		VU
<i>Orchesia fasciata</i> (Illiger, 1798)	E	T M O	C S N		NT			VU
<i>Orchesia minor</i> Walker, 1937	E	M	C S N					
<i>Phloiotrya rufipes</i> (Gyllenhal, 1810)	G	T M	C S N		EN			VU
<b>Mordellidae</b>								
<i>Mordellistena neuwaldeggiana</i> (Panzer, 1796)	F	T M	C S N					
<b>Oedemeridae</b>								
<i>Oedemera flavipes</i> (Fabricius, 1792)	F	T M	C S N					
<i>Oedemera podagrariae</i> (Linnaeus, 1767)	F	T M	C S N					
<b>Aderidae</b>								
<i>Aderus populneus</i> (Panzer, 1796)	I	T M	C S N					VU
<b>Meloidae</b>								
<i>Meloe proscarabaeus</i> Linnaeus, 1758	A	T M	C S N D			EN		VU
<i>Meloe rugosus</i> Marsham, 1802	A	T M	C S N D	VU		VU		CR
<b>Salpingidae</b>								
<i>Lissodema cursor</i> (Gyllenhall, 1813)	E	T M	C S N					
<i>Lissodema denticolle</i> [= <i>quadripustulatum</i> auct.] (Gyllenhall, 1813)	E	T M	C S N					
<i>Salpingus aeneus</i> (Olivier, 1807) <sup>►14</sup>	B D	T M	C S N		EN		DD	
<i>Salpingus planirostris</i> (Fabricius, 1787)	D	T M	C S N					
<i>Vincenzellus ruficollis</i> (Panzer, 1794)	D	T M	C S N					
<b>Anthicidae</b>								
<i>Anthicus antherinus</i> (Linnaeus, 1761)	H	T M	C S N					
<i>Omonadus floralis</i> (Linnaeus, 1758)	H	T M O	C S N					

Tab. 1 continued 6

<b>Family / Species</b>	Codes of rec.	Thermo- prefer.	Originality of habitat	Ecosozological status				
				Sk	Cz	A	Pl	G
<i>Omonadus formicarius</i> (Goeze, 1777)	G	T M	C SN					
<b>Alleculidae</b>								
<i>Gonodera luperus</i> (Herbst, 1783)	E	T M	C SN					
<i>Hymenalia rufipes</i> (Fabricius, 1792)	G	T M	C SN D					EN
<i>Omophlus lividipes</i> Mulsant, 1856)	E	T	C SN					
<b>Tenebrionidae</b>								
<i>Blaps mortisaga</i> (Linnaeus, 1758)	E	T M	C SN D A					
<i>Nalassus dermestoides</i> (Illiger, 1798)	B	T M	C SN					VU
<i>Platyscelis</i> [= <i>Oodescelis</i> ] <i>polita</i> (Sturm, 1807) <sup>15</sup>	G	T M	C SN	RE	EN	DD	ø	
<i>Opatrium sabulosum</i> (Linnaeus, 1761)	C D	T M	C SN D					
<i>Palorus depressus</i> (Fabricius, 1790)	D	T M	C SN			NT		VU
<i>Pedinus femoralis</i> (Linnaeus, 1767)	G	T M	C SN			NT		CR
<i>Platydema violaceum</i> (Fabricius, 1790)	E	T M	C SN	NT	NT			VU
<i>Scaphidema metallicum</i> (Fabricius, 1792)	C F	T M	C SN					
<i>Stenomax aeneus</i> (Scopoli, 1763)	B	T M	C SN					
<b>Cerambycidae</b>								
<i>Arhopalus</i> [= <i>Criocephalus</i> ] <i>rusticus</i> (Linnaeus, 1758)	F	M	C SN					
<i>Chlorophorus sartor</i> (O. F. Müller, 1766)	E	T	C SN			DD	VU	
<i>Cerambyx scopolii</i> Fuessly, 1775	B	T M	C SN D					VU
<i>Exocentrus lusitanus</i> (Linnaeus, 1767)	F	T M	C SN					VU
<i>Grammoptera ruficornis</i> (Fabricius, 1781)	B	T M	C SN					
<i>Grammoptera ustulata</i> (Schaller, 1783)	B	T M	C SN					
<i>Hylotrupes bajulus</i> (Linnaeus, 1758)	C	T M	C SN D A					
<i>Leptura quadrifasciata</i> Linnaeus, 1758	F	T M	C SN D					
<i>Pachytodes erraticus</i> (Dalman, 1817)	C	T M	C SN			RE		
<i>Phymatodes testaceus</i> (Linnaeus, 1758)	E	T M	C SN D					
<i>Poecilium</i> [= <i>Phymatodes</i> ] <i>alni</i> (Linnaeus, 1767)	C	T M	C SN					
<i>Pogonoherus fasciculatus</i> (De Geer, 1775)	H	T M	C SN					
<i>Pogonoherus hispidulus</i> (Piller & Mitterpacher, 1783)	F	T M	C SN					
<i>Pogonoherus hispidus</i> (Linnaeus, 1758)	C	T M	C SN					

Tab. 1 continued 7

<b>Family / Species</b>	Codes of rec.	Thermo- prefer.	Originality of habitat	Ecosozological status				
				Sk	Cz	A	Pl	G
<i>Stenocorus quercus</i> (Götz, 1783)	E	T	C SN		NT		VU	EN
<i>Strangalia attenuata</i> (Linnaeus, 1758)	E	T M	C SN					
<i>Tetrops praeustus</i> (Linnaeus, 1758)	B	T M	C SN					
<b>Chrysomelidae</b>								
<i>Calomicrus circumfusus</i> (Marsham, 1802)	F	T M	C SN				DD	VU
<i>Cassida azurea</i> Fabricius, 1801 <sup>¶16</sup>	E	T M	C SN		CR	EN		VU
<i>Clytra quadripunctata</i> (Linnaeus, 1758)	D	T M	C SN					
<i>Gonioctena fornicata</i> (Bruggemann, 1873)	E	T M	C SN					
<i>Chrysolina sanguinolenta</i> (Linnaeus, 1758)	D	T M	C SN					
<i>Cryptocephalus bipunctatus</i> (Linnaeus, 1758)	D E	T M	C SN					
<i>Cryptocephalus cordiger</i> (Linnaeus, 1758)	D	T M	C SN					EN
<i>Cryptocephalus nitidulus</i> Fabricius, 1787	E	T M	C SN					VU
<i>Cryptocephalus quatuordecimmaculatus</i> Schneider, 1792	C	T	C SN					
<i>Labidostomis humeralis</i> (D. H. Schneider, 1792)	G	T M	C SN					VU
<i>Lachnaia sexpunctata</i> (Scopoli, 1763)	E	T	C SN		CR	RE	EN	
<i>Luperus xanthopoda</i> (Schrink, 1781)	B	T M	C SN				DD	EN
<b>Bruchidae</b>								
<i>Bruchus luteicornis</i> Illiger, 1794	D	T M	C SN					
<b>Anthribidae</b>								
<i>Anthribus [= Brachytarsus] nebulosus</i> Forster, 1770	B	T M	C SN					
<i>Choragus sheppardi</i> Kirby, 1819 <sup>¶17</sup>	E	T M O	C S N D	VU	VU			VU
<i>Platyrhinus resinosus</i> (Scopoli, 1763)	J	M	C SN			NT		
<i>Pseudeuparius [= Enedreytes] sepicola</i> (Fabricius, 1792)	B	T M	C SN			NT		
<b>Rhynchitidae</b>								
<i>Involvulus [= Rhynchites] aethiops</i> (Bach, 1854)	E	T M	C					
<i>Lasiorhynchites olivaceus</i> (Gyllenhal, 1833)	B	T M	C SN					
<b>Curculionidae</b>								
<i>Acallocrates colonnellii</i> Bahr, 2003	G	T M	C SN					

Tab. 1 continued 8

<b>Family / Species</b>	Codes of rec.	Thermo- prefer.	Originality of habitat	Ecosozological status				
				Sk	Cz	A	Pl	G
<i>Anthonomus pedicularius</i> (Linnaeus, 1758)	D	T M	C SN					
<i>Anthonomus phyllocola</i> (Herbst, 1795)	G	T M	C SN					
<i>Barypeithes chevrolati</i> (Bohemian, 1843)	J	T M	C SN					
<i>Barypeithes pellucidus</i> (Bohemian, 1843)	D	T M	C SN					
<i>Brachysomus echinatus</i> (Bonsdorff, 1785)	E G	T	C SN					
<i>Caenorhinus aequatus</i> (Linnaeus, 1767)	C	T M	C SN					
<i>Centricnemus [= Peritelus] leucogrammus</i> (Germar, 1824)	E	T	C SN		NT	NT		
<i>Cirrorhynchus [= Otiorhynchus] kelecsenyi</i> (Frivaldszky, 1892)	D	T	C SN					
<i>Curculio glandium</i> Marsham, 1802	B F	T M	C SN					
<i>Curculio pellitus</i> (Bohemian, 1843)	F	T	C SN					VU
<i>Dorytomus hirtipennis</i> Bedel, 1884	F	T M	C SN					
<i>Hypera postica</i> (Gyllenhal, 1813)	J	T M	C SN					
<i>Larinus planus</i> (Fabricius, 1792)	B	T M	C SN					
<i>Lixus fasciculatus</i> Boheman, 1835	E	T	C SN				LC	CR
<i>Lixus vilis</i> (Rossi, 1790)	B	T	C SN		EN			CR
<i>Magdalis flavigornis</i> (Gyllenhal, 1836)	D	T M	C SN					
<i>Magdalis rufa</i> Germar, 1824	G	T	C SN					EN
<i>Orcheses [= Rhynchaenus] pilosus</i> (Fabricius, 1781)	H	T M	C SN					
<i>Otiorhynchus fullo</i> (Schrank, 1781)	B	T	C SN					
<i>Otiorhynchus rugosostriatus</i> Schrank, 1781)	C	T	C SN			NT		
<i>Otiorhynchus sulcatus</i> (Fabricius, 1775)	D	T M	C SN					
<i>Otiorhynchus tenebricosus</i> (Herbst, 1784) [= <i>fuscipes</i> (Olivier, 1807)]	D	T M	C SN					
<i>Pachyrhinus [= Scythropus] mustela</i> (Herbst, 1797)	C	T M	C SN					
<i>Phyllobius glaucus</i> (Scopoli, 1763)	D	T M	C S N D					
<i>Polydrusus mollis</i> (Ström, 1768)	C	T M	C S N D					
<i>Rhinocyllus conicus</i> (Frölich, 1792)	D	T M	C S N D					
<i>Rhyncolus reflexus</i> Boheman, 1838	G	T M	C SN					EN
<i>Rynchaenus pilosus</i> (Fabricius, 1781)	D	T M	C SN					
<i>Sitona hispidulus</i> (Fabricius, 1776)	H	T M	C SN					

Tab. 1 continued 9

<b>Family / Species</b>	Codes of rec.	Thermo- prefer.	Originality of habitat	Ecosozological status				
				Sk	Cz	A	Pl	G
<i>Squamapion [= Apion] flavimanum</i> (Gyllenhal, 1833)	F	T M	C SN			NT		
<i>Stenocarus ruficornis</i> (Stephens, 1831)	I	T M	C SN					
<i>Stereocorynes [= Rhyncolus] truncorum</i> (Germar, 1824)	F	T M	C SN					
<i>Tychius pumilus</i> C. Brisout, 1862	D	T M	C SN		EN			VU
<b>Scolytidae</b>								
<i>Orthotomicus longicollis</i> (Gyllenhal, 1827)	H	T M	C SN	VU				CR
<i>Scolytus intricatus</i> (Ratzeburg, 1837)	D	T M	C SN					

**Codes of records:** A – March 28, 2015, B – April 17, 2015, C – April 24, 2015, D – May 12, 2015, E – June 6, 2015, F – June 18, 2015, G – June 26, 2015, H – October 2, 2015, I – October 30, 2015, J – March 10, 2017. **Thermopreference:** T – thermophilous, M – mesophilous, O – oreophilous.

**Originality of habitat:** C – climax, SN – semi-natural, D – disturbed, A – artificial habitat.

**Ecosozological status (ESS):** Sk – Slovakia, Cz – Czech Republic, A – Austria, Pl – Poland, G – Germany.

**Categories of ESS:** RE – regionally extinct (RE<sup>l</sup> – notes in the main text), CR – critically endangered, EN – endangered, VU – vulnerable, NT – near threatened, LC – least concern, DD – data deficient, ø not documented in the country (+ but its occurrence is expectable), ? – the species is surprisingly missing in this Red List; § – protected species.

5 *Lucanus cervus* – occasionally observed (3 times) on damaged oak stumps; only smaller specimens occur here, because old robust trees are missing in this area. This species of European interest is quite abundant anywhere in Slovakia, where old and hollow deciduous trees (mainly oaks) are not rare.

6 *Onthophagus taurus* – in the faeces of a mouflon in open shrubby forest. A rare thermophilous species, nevertheless its population is recently slowly increasing. Certainly there was more abundant when domesticated animals were grazed here.

7 *Sisyphus schaefferi* – in the faeces of a mouflon on the xerothermic slope, observed several times. Often cited and in warmer regions it is a quite abundant species. He is often seen on the soil surface running around with the dung marbles. His legal protection, at least in Slovakia, may be debatable.

8 *Anthaxia cichorii* – accidentally on flowers (mainly Asteraceae) in xerothermic meadows and edges. A scarce thermophilous species, apparently vanishing in western and northern part of its range. In Germany and Poland it is considered to be a regionally extinct species; and the same concerns the Czech Republic (FARKAČ et al., 2005), despite in the web site «faunaeur.org» (KUBÁŇ, BÍLÝ, 2013) it is scored as present. Note: A lot of jewel beetles (Buprestidae) are threatened by reduction of the grazing and spontaneous succession.

9 *Isorhipis melasoides* – accidentally swept from the vegetation of a forest edge. A rare saproxylic species of warmer deciduous forests, it indicates the well-preserved environments. Although about 20 records are cited from Slovakia (MERTLIK, 2008), its habitats always deserve attention.

10 *Ochina latreillei* – shaken down from dying branches of an oak. A scattered and very rare species of warm open deciduous forests. The following recent records are available:

NPR Jurský Šúr, oak grove ( $48^{\circ} 13' 23.26''$  N,  $17^{\circ} 12' 53.60''$  E; 135 m), April 2008, 3 specimens (MAJZLAN, 2010a); Slovenská skala rock near the village of Jelšavská Teplica ( $48^{\circ} 36' 55.52''$  N,  $20^{\circ} 15' 40.00''$  E; 340 – 480 m), rocky steppe, May 28, 2008, J. Lahoda lgt.; the Muteň Mt near the village of Šivetice ( $48^{\circ} 35' 27.52''$  N,  $20^{\circ} 16' 12.00''$  E; 320 – 450 m), shaken down from oak branches in older deciduous forest, May 16, 2009, V. Benedikt lgt. (BENEDIKT, 2014); NR Burdov, xerothermic oak forest ( $47^{\circ} 49' 31.80''$  N,  $18^{\circ} 44' 55.02''$  E; 137 m), Malaise trap, July 2010, 2 specimens (MAJZLAN, 2016c); the town of Svatý Jur ( $48^{\circ} 15' 38.13''$  N,  $17^{\circ} 12' 14.76''$  E; 228 m), Malaise trap in the abandoned vineyard, August 15, 2011 (MAJZLAN, 2011); the city of Bratislava – Rača ( $48^{\circ} 13' 49.79''$  N,  $17^{\circ} 10' 30.53''$  E; 230 m), Malaise trap, September 2013 (MAJZLAN, 2014a); Protected site Šádorky ( $48^{\circ} 52.065'$  N,  $18^{\circ} 29.344'$  E; 255), Malaise trap, June 2015, 2 specimens and July 2015, 1 specimen (MAJZLAN, 2016a); NR Kulháň ( $48^{\circ} 52.065'$  N,  $18^{\circ} 29.344'$  E, 355 m), Malaise trap, May 2014 (MAJZLAN, 2015); the village of Brekov – the castle hill ( $48^{\circ} 53.998'$ ,  $21^{\circ} 49.929'$  E; 274 m), Malaise trap, August 2015 (MAJZLAN, 2016b). Note: Referred records after 2008 indicate that its abundance is recently increasing (perhaps due to the global warming).

11 *Acyrona japonica* – shaken down from drying oak branches. A very rare notable species with wide, nevertheless markedly discontinuous range. The first record from Slovakia has been published from „Kamenica“ (DFS 8178, certainly the village of Kamenica nad Hronom), ex larva, 1985, R. Veigler lgt.; the village of Plešivec (DFS 7488), July 7, 1985, M. Mikát lgt. (KOLIBÁČ, 1993). The further recent records: the village of Plášťovce ( $48^{\circ} 10' 7.16''$  N,  $19^{\circ} 0' 10.76''$  E; 279 m), shaken down from oak branches on the xerothermic slope, June 16, 1996, 4 specimens (FRANC, 1999); the townlet of Dolné Vestenice ( $48^{\circ} 42' 53.41''$  N,  $18^{\circ} 23' 21.75''$  E; 390 m), June 10, 2009, shaken down from the branches of a hazel (*Corylus avellana!*), V. Franc et M. Melicherčíková leg., previously unpublished; the townlet of Jelšava – Skalka hill ( $48^{\circ} 37' 1.09''$  N,  $20^{\circ} 14' 2.54''$ ; 330 – 420 m), June and July 2006 – 2010, 6 specimens shaken down individually from the dying oak branches, V. Benedikt, V. Dongres, J. Krátký et M. Mantič lgt. (BENEDIKT, 2014).

12 *Triplax lepida* – on the bracket fungus *Polyporus anisoporus* growing on older oak stubs. A scarce species occurring occasionally on warm sites only. A larger number of recent records is available.

13 *Bothrideres bipunctatus* (formerly always cited as *B. contractus*) – accidentally shaken down from the dying branches of an oak infected by mycelium. A scattered

and rare species of older deciduous (often alluvial) forests, occurring always sporadically. Recent records are not numerous:

The village of Turá ( $48^{\circ} 09' 14.08''$  N,  $18^{\circ} 35' 10.54''$  E; 153 m), under the bark of a damaged willow, June 5, 1989; the village of Posádka ( $48^{\circ} 22' 47.02''$  N,  $17^{\circ} 46' 18.56''$  E; 140 m), similar circumstances, April 18, 1992 (FRANC, 1995); NR Vŕšok, widely known as 'Hegyfarok' ( $47^{\circ} 50' 39.17''$  N,  $18^{\circ} 37' 26.61''$  E; 225 m), I. Rychlík lgt., undated (MAJZLAN, 1997); NR Ostrov Kopáč ( $48^{\circ} 5' 39.09''$  N,  $17^{\circ} 10' 1.49''$  E; 132 m), undated (MAJZLAN, 2007); NR Báb ( $48^{\circ} 18' 08''$  N,  $17^{\circ} 53' 25''$  E; 213 m), pitfall trap, July 2007 (MAJZLAN, 2009b); the town of Senec – potential protected site 'Martinský les' ( $48^{\circ} 15' 50.81''$  N,  $17^{\circ} 23' 1.39''$  E;  $\pm 155$  m), 3 specimens 2006 – 2007, without additional ecological information (MAJZLAN, 2012); NPR Jurský Šúr, oak grove ( $48^{\circ} 13' 23.26''$  N,  $17^{\circ} 12' 53.60''$  E; 135 m), August 2008, 2 specimens (MAJZLAN, 2010a); the village of Krasňany ( $48^{\circ} 12' 5.10''$  N,  $17^{\circ} 07' 9.54''$  E; 290 m), pitfall trap, May 2012, 2 specimens (MAJZLAN, 2014a); the village of Gajary ( $48^{\circ} 28' 0.94''$  N,  $16^{\circ} 55' 08.75''$  E; 149 m), Malaise trap, May 2014 (MAJZLAN, 2014b). Notable record has been published directly from the capitol: Bratislava, old damaged poplars, undated (MAJZLAN, 1991).

14 *Salpingus aeneus* – shaken down from dying branches of oaks, more than 10 specimens. A rare species of warmer open deciduous forests, known from a larger number of recent records. Its strong population in studied site is remarkable.

15 *Oodescelis polita* – under the stone in a rocky steppe. A very local and rare wingless beetle, strongly tied to grassland habitats. Known from a relatively large amount of older and recent records (FRANC, 2008), nevertheless its isolated populations are apparently threatened by reduction of the grazing and spontaneous succession. It is highly notable that it may occur in very large range of altitudes from hilly areas of South Slovakia to high mountains: Veľká Fatra Mts – NR Tlstá (DFS 7079d) August 6, 1975 and Chočské vrchy Mts – NR Veľký Choč (DFS 6882a/c),

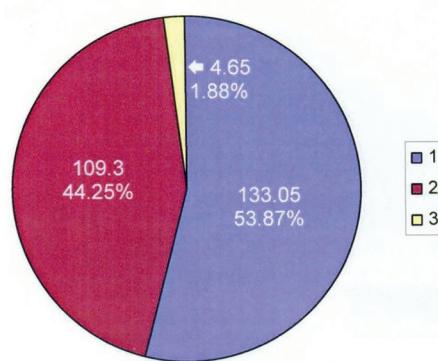


Fig. 2. Beetle faunal composition according to thermopreference: 1 thermophilous, 2 mesophilous, 3 oreophilous species.

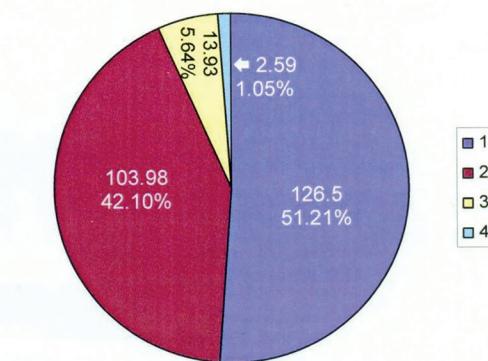


Fig. 3. Beetle faunal composition according to originality of habitat: 1 climax, 2 semi-natural, 3 disturbed, 4 artificial habitats.

July 10, 1977, 4 specimens V. Rakšáni lgt. et coll. (very remarkable records from subalpine altitudes!)

16 *Cassida azurea* – swept from the vegetation of flowery forest edge. A local and scarce species living on plants of the family Caryophyllaceae. Apparently decreasing in several European countries, like another species of this genus.

17 *Choragus sheppardi* – shaken down from dying branches of an oak, 2 specimens. A very rare species of open deciduous forests (often xerothermic ones), little known due to its tiny dimensions. Only a small number of recent records available:

NR Vŕšok, widely known as ‘Hegyfarok’ ( $47^{\circ} 50' 39.17''$  N,  $18^{\circ} 37' 26.61''$  E; 225 m), undated (MAJZLAN, 1997); Strážovské vrchy Mts – NR Vápeč ( $48^{\circ} 56' 9.65''$  N,  $18^{\circ} 19' 34.97''$  E; 705 m), knocked down from the dying branches of a hazel (*Corylus avellana*), June 19, 2003, 2 specimens (FRANC, 2004); Jurský Šúr, alder forest, July 10, 2009 (MAJZLAN, 2010b); the village of Krasňany ( $48^{\circ} 12' 5.10''$  N,  $17^{\circ} 07' 9.54''$  E; 290 m), Malaise trap, August 2012; the city of Bratislava – Rača ( $48^{\circ} 13' 49.79''$  N,  $17^{\circ} 10' 30.53''$  E; 230 m), Malaise trap, July 2013, 2 specimens (MAJZLAN, 2014a); NR Kulháň ( $48^{\circ} 52.065'$  N,  $18^{\circ} 29.344'$  E, 355 m), Malaise trap, June 2014, 2 specimens and August 2014, 3 specimens (MAJZLAN, 2015); Protected site Šádorky ( $48^{\circ} 52.065'$  N,  $18^{\circ} 29.344'$  E; 255), August 2015, 4 specimens (MAJZLAN, 2016a).

## CONCLUSION

In our introductory research we found out 247 beetle species. This number is not definitive, of course. Some of documented species rank among infrequent or up to rare ones, including *Satrapes sartorii*, *Onthophagus taurus*, *Hyllis foveicollis*, *Isorhipis melasoides*, *Gastrallus laevigatus*, *Ochina latreillei*, *Ancyrona japonica*, *Tilloidea unifasciata*, *Bothrideres bipunctatus*, *Platyscelis polita* and *Choragus sheppardi*. Several findings in this anthropogenous habitat are surprising. Later we will deal with instructive analysis of the thermopreference (fig. 2) and originality of habitats (fig. 3) from the perspective of individual species. We assumed that the share of thermophilous species will be prevailing – it is more than half: 53.87%. The species of warm and moderate habitats together represent more than 98% of the beetle fauna. The analysis of the beetle faunal composition according to originality of habitat is even more interesting. The share of climax species is surprisingly high – 51.21%, despite this habitat is not at all „pristine“. Experts’ opinions on the climax, especially those conservative require revision and comprehensive view of modern ecology. We suppose, that some particular stages of ongoing succession process can be interpreted as „partial climax stages“ tending towards the „final“ arrangement of the biota. It is necessary to emphasize that the climax is not „definitive“ and „constant“ stage, on the contrary it is a highly dynamic and variable process.

It is sad, but a large amount of abandoned pastures is scattered throughout Slovakia. This contradicts the fact that traditional methods of farming (especially grazing) are most suitable for the sustainable development of suburban and rural partially agricultural land. Grazing helps to preserve steppe character of the habitats

in Central Europe. Grazing restriction, evident almost in the whole Europe, is unnecessary and counterproductive also in protected areas, on the other hand, it should be supported. It does not concern intensive and concentrated grazing in a small plot of course – it causes destruction of the soil, including fauna. Scattered grazing in the meadows, in sparse forests and xerothermic slopes is the most desirable from the gene-pool point of view; and it does not concern beetles and insects only. We are sure that the sustainable development of the countryside (including grazing) ought to be supported by the government and state institutions.

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