

STRUCTURE OF LEPIDOPTEROCENOSSES ON OAKS *QUERCUS DALECHAMPII* AND *Q. CERRIS* IN CENTRAL EUROPE AND ESTIMATION OF THE MOST IMPORTANT SPECIES

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ABSTRACT: On the basis of lepidopterous larvae a total of 96 species on *Quercus dalechampii* and 58 species on *Q. cerris* were recorded in 10 study plots of Malé Karpaty and Trnavská pahorkatina hills. The families Geometridae, Noctuidae and Tortricidae encompassed the highest number of found species. The most recorded species belonged to the trophic group of generalists. On the basis of total abundance of lepidopterous larvae found on *Q. dalechampii* from all the study plots the most abundant species was evidently *Operophtera brumata*. The most abundant species on *Q. cerris* was *Cyclophora ruficiliaria*. Based on estimated oak leaf area consumed by a larva it is shown that *Lymantria dispar* was the most important leaf-chewing species of both *Q. dalechampii* and *Q. cerris*.

KEY WORDS: Slovakia, *Quercus dalechampii*, *Q. cerris*, the most important species.

About 300 Lepidoptera species are known to damage the assimilation tissue of oaks in Central Europe (Patočka, 1954, 1980; Patočka et al. 1999; Reiprich, 2001). Lepidoptera larvae are shown to be the most important group of oak defoliators (Patočka et al., 1962, 1999). *Quercus dalechampii* is one of the most common oaks occurring across Europe (especially in the southern part) from western Italy and Sicilia to Bulgaria and Romania. It extends north to Slovakia (central Europe). *Q. cerris* is native to southern Europe and Asia Minor. It is rarer in Central Europe. Its range extended north to Hungary and Slovakia. At present, the territory of Slovakia represents the northern native limit of the extension of both oak species.

In the past, harmful lepidopterous species on four oak species (*Quercus cerris*, *Q. pubescens*, *Q. petraea*, *Q. robur*) in Slovakia were studied (Patočka et al., 1962; Kulfan, 1990, 1998, 2002).

The main aim of this paper is to investigate the structure of lepidopterous larvae communities on Dalechampii oak (*Q. dalechampii*) and European turkey oak (*Q. cerris*) and to determine the most important pests of these wood species under conditions of relatively well-preserved plant communities in Central Europe.

MATERIALS AND METHODS

For the study of the lepidopteran larval stages on *Quercus dalechampii* and *Quercus cerris* the territories of Protected Landscape Area of Malé Karpaty and Trnavská pahorkatina hills situated in the center of Europe in the western part of Slovakia were selected. The vast majority of study plots is located in southern to northern part of the Malé Karpaty Mts. in altitude about 240-350 m a.s.l. with an average annual temperature of 8-9 °C. Study plots in Trnavská pahorkatina hills are situated near the Malé Karpaty Mts. in altitude 240 m. The annual precipitation of both territories is about 650-800 mm.

Study plots:

Vinosady (VI), 48°19' N, 17°17' E, GRN (Grid Reference Number of the Databank of the Fauna of Slovakia) 7669d, 280 m a. s. l.: a 60-80-year-old forest at the foot of the Kamenica hill, oriented onto NW, W neighbouring with drier subxerophilous meadows and shrub complexes. Besides of *Quercus dalechampii*, the tree stratum consists of *Quercus cerris* and *Acer campestre*.

Cajla (CA), 48°20' N, 17°16' E, GRN 7669c, 260-280 m a. s. l.: an 80-100 year-old forest at the foot of the Malá cajlanská homola hill, oriented onto S and neighbouring with meadows and vineyards on S and E, from N and W closed forest complexes. *Quercus dalechampii* and *Carpinus betulus* predominate in the tree layer.

Fúgelka (FU), 48°22' N, 17°19' E, GRN 7669b, 350 m a. s. l.: an 80-100-year-old forest near the Dubová village, oriented onto S. Besides of *Quercus dalechampii*, the tree stratum consists of *Acer pseudoplatanus*.

Lindava (LI) (Nature Reserve), 48°22' N, 17°22' E, GRN 7670a, 240 m a.s.l.: an 80-100 (120)-year-old forest near the village of Píla. *Q. dalechampii* and *Q. cerris* predominate in the tree layer.

Horný háj (HH), 48°29' N, 17°27' E, GRN 7570b, 240 m a. s. l.: a larger complex of an island forest 60-80-years old near the village of Horné Orešany, surrounded by fields and vineyards, oriented onto W and SW. *Quercus cerris*, *Quercus dalechampii*, *Carpinus betulus* and *Fraxinus excelsior* predominate in the tree layer.

Lošonec – lom quarry (LL), 48°29' N, 17°23' E, GRN 7570b, 340 m a. s. l.: an 80-100-year-old forest oriented onto SW, neighbouring with mesophilous meadows and pastures. The tree layer consists of *Quercus dalechampii*, *Quercus cerris* and *Carpinus betulus*. The leaf litter, herbage undergrowth and trees are strongly covered with calcareous dust from a near-by quarry.

Lošonský háj (LH) (Nature Reserve), 48°28' N, 17°24' E, GRN 7570b, 260 m a. s. l.: an 80-100-year-old oak-hornbeam forest oriented onto NE, surrounded by closed forest complexes. *Q. dalechampii*, *Q. cerris* and *Carpinus betulus* predominate in the tree stratum.

Naháč – Kukovačník (NA), 48°32' N, 17°31' E, GRN 7471c, 300 m a. s. l.: a small forest island, approximately 40-60-year-old surrounded by fields and pastures, oriented onto NE. *Quercus dalechampii*, *Quercus cerris* and *Carpinus betulus* predominate in the tree layer.

Naháč – Katarínka 1 (NK1) (Nature Reserve), 48°33' N, 17°33' E, GRN 7471a, 340 m a. s. l.: a 40-60-year-old forest oriented onto NW, surrounded by closed forest ecosystems. *Quercus dalechampii* and *Carpinus betulus* predominate in the canopy.

Naháč – Katarínka 2 (NK2), (Nature Reserve), 48°33' N, 17°32' E, GRN 7471a, 300 m a. s. l.: an 80-100 year-old forest under the monastery ruins. *Quercus virgiliana*, *Quercus cerris* and *Tilia cordata* predominate in the tree stratum.

The study plots LI and HH are situated in Trnavská pahorkatina hills, the other ones in Malé Karpaty Mts. According to the Geobotanic Map of Slovakia (Michalko, 1986) Carpathian mesophilous oak-hornbeam woods (*Carpinion betuli* Issler, 1931 em. Mayer, 1937) (the study plots CA, VI, FU, LL, LH, NA, NK) and subxerothermophilous forests with European Turkey Oak (*Quercion confertae-cerris* Horvat, 1954) (the study plot LI) are considered as typical natural vegetation in this territory.

The map, pedological and phytocoenological characteristics of the investigated area are given in detail by Zlinská et al. (2005).

Lepidopterous larvae were taken from oak trees on 10 study plots at about two-week intervals during the growing season (April–November) of 2000–2002. The beating method using apparatus of size 1 x 1 m was used. As a standard, 25 beats were performed in each study plot (one sample represented 25 beats).

The larvae were identified using the keys by Gerasimov (1952), Patočka (1954, 1980) and Patočka et al. (1999).

The nomenclature and systematic classification of the lepidopterous species were used according to Laštůvka (1998). Species marked as pests and calamitous pests and common oak species are in accordance with publication of Patočka et al. (1999). The trophic groups of caterpillars were established according to Brown & Hyman (1986). Three basic groups were distinguished: S₂ – narrow oligophages (caterpillars living only on one tree genus - *Quercus*), S₃ – wider oligophages (caterpillars feeding on two or more genera from one plant family or taxonomically related families – Fagaceae: *Quercus*, *Fagus*, *Castanea*) and G – generalists or polyphagous sp. (caterpillars living on several plant species from many families).

RESULTS AND DISCUSSION

A total of 2547 caterpillars were collected at ten study plots during 2000–2002, of them 2140 on *Quercus dalechampii* and 407 on *Q. cerris*. They represented 107 species belonging to 18 families (96 and 58 sp. on *Q. dalechampii* and *Q. cerris*, respectively) (Table 1). The families Geometridae, Noctuidae and Tortricidae encompassed the highest number of species found (31, 25 and 13 species, respectively). The families Geometridae and Tortricidae comprised the highest number of pests according to literature (Patočka et al., 1999) (Table 1). The most abundant species were calamitous pests - the winter moth (*Operophtera brumata*) at Cajla and the gypsy moth (*Lymantria dispar*) at Vinosady (Table 1). Abundance of *Lymantria dispar* on *Quercus cerris* was relatively low (Table 1). In neighbouring Hungary, the gypsy moth appeared to prefer *Q. cerris* stands (Csóka, 1998). Another notable oak pest of Slovakia according to Patočka et al. (1999), the green oak roller moth (*Tortrix viridana*) was found only on *Quercus dalechampii* (Table 1). Caterpillars were poorly represented at Horný háj due to the presence of multiform ants, which are predators of lepidopterous larvae concentrated on this plot (18 and 17 species on *Q. dalechampii* and *Q. cerris*, respectively) (Table 1). In general, when compared with other areas of Central Europe, the observed abundance of caterpillars on oaks correspond to the latent phase of gradation cycle (Patočka et al., 1962; Kulfan, 1990, 1992, 1998, 2002; Kulfan et al., 1997, 2006).

The most recorded species belonged to the trophic group of generalists (67 species). Only 8 species were wider oligophages. Other species (24 sp.) – narrow oligophages feed only on oaks and are considered to be typical oak species (Table 1).

Abundance of lepidopterous caterpillars (Tables 1 and 2) is not always used to estimate the economic importance of individual species because the caterpillars of many Lepidoptera species with relatively high abundance reach a little weight and therefore have a low consumption of foliage. Caterpillars with high abundance and low weight may not have great economic importance and, on the contrary, the species with a lower abundance but high weight may be of economic significance. Table 2 shows for *Q. dalechampii* the sequence of 38 lepidopterous species on the basis of total abundance with the value greater or equal to 10. Based on total abundance of lepidopterous caterpillars found on *Q. dalechampii* from all study

plots the most abundant species was evidently winter moth (*Operophtera brumata*) (Table 2). Similarly, table 3 shows the sequence of the first 13 species found on *Q. cerris* with the value of total abundance greater or equal to 10. In this case, the Jersey Mocha (*Cyclophora ruficiliaria*) had the highest abundance. This species does not belong to the economically important species (Patočka et al., 1999).

Tables 2 and 3 show the average weight of the last larval instar of each species according to Patočka et al. (1962). Weight of the last larval instar of the species marked with an asterisk was estimated on the basis of known weight of caterpillar with similar body size (Patočka, 1954, 1980). From the literature it is known that 1 gram of caterpillar consumes during its larval stages about 80 cm² of leaf area, what corresponds approximately to 3 average oak leaves (Patočka et al., 1962). Therefore, a more realistic picture of the economic importance of individual lepidopterous species is obtained by multiplying the abundance and average weight of larval stage (last instar) of relevant species. Obtained from the product in grams is then possible to estimate the consumed leaf area in m², which is shown graphically (Figs. 1 and 2). Evaluated species occur mainly in spring time. The graph (Fig. 1) shows that the gypsy moth (*Lymantria dispar*) is clearly the most important leaf-chewing pest on oak *Q. dalechampii*. Followed by *C. trapezina*, *Orthosia cerasi* and other species of moths, mostly with relatively large body mass. Theoretically derived harmfulness of *Cosma trapezina* is not in fact so high as is apparent in the graph (Fig. 1) because it is casual predator of other leaf-eating caterpillars chiefly from the families Tortricidae and Geometridae (Patočka, 1954, 1980; Patočka et al., 1962). Geometer moth *Operophtera brumata* with the highest abundance (Table 2) is the sixth in order on the basis of leaf area consumed (Fig. 1). *Lymantria dispar* was also the most important species on oak *Q. cerris* (Fig. 2). Theoretically derived amount of foliage consumed by *L. dispar* is a multiple higher compared with the following species (Fig. 2). Research of caterpillars on two studied oak trees (*Q. dalechampii* and *Q. cerris*) confirmed the fact that *L. dispar* was the most important leaf-chewing species of oaks in central Europe. Besides, this species occurs in the larval stage in the springtime and early summer, when the oaks are most sensitive to the presence of leaf-chewing species. Finally, it should be noted that harmfulness of individual lepidopterous species in the larval stage is influenced largely by parasitization and also by time shift of occurrence of some species during season.

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Table 1. Abundance of species recorded on *Quercus dalechampii* and *Q. cerris* in 10 study plots. ► - common oak species in Slovakia, ! - pest, !! - calamitous pest, Qd - *Quercus dalechampii*, Qc - *Quercus cerris*, 4-11 - months of occurrence, S2 - narrow oligophagous species, S3 - wider oligophagous species, G - generalists, U - unknown

Families and Species / Study plots	VI Qd	CA Qd	FU Qd	LI Qd	HH Qd	HH Qc	LL Qd	LL Qc	LH Qd	NA Qd	NA Qc	NK1 Qd	NK2 Qc	Months of occurrence	Trophic group
Psychidae															
► <i>Sternopteryx fusca</i> (Haworth, 1809)				1										5	G
Bucculatricidae															
► <i>Bucculatrix ulmella</i> Zeller, 1848										2		2	1	6,8	G
Gracillariidae															
► <i>Phyllonorycter</i> sp.			1											7	U
Ypsolophidae															
► <i>Ypsolopha alpella</i> (Denis et Schiffmüller, 1775)	6			3	1	9		4	2	4	19	9	7	5,6	S2
► <i>Ypsolopha panthehesella</i> (Linnaeus, 1761)						2			2					5	G
► <i>Ypsolopha ustella</i> (Clerck, 1759)	1	3		1	1		2	1	2	1	2	2		5,6	G
Oecophoridae															
► <i>Carcina quercana</i> (Fabricius, 1775)	2	8	5	15	3		7	1	3	3	1	16		5-8	G
► <i>Diurnea fagella</i> (Denis et Schiffmüller, 1775)	2	1			2		1			5		2		6-9	G
►! <i>Diurnea lipsiella</i> (Denis et Schiffmüller, 1775)	2	8	2	2		1	1		2	1		18		5-8	G
Coleophoridae															
<i>Coleophora ibipennella</i> Zeller, 1849					1						1			5	G
<i>Coleophora kuehnella</i> (Goeze, 1783)												1		5	S2
► <i>Coleophora lutipennella</i> (Zeller, 1838)	2	12	11	15			13	1	5	5	17	23	4	4-6	S2
<i>Coleophora siccofolia</i> Stainton, 1856				1								24		4-5	G
Gelechiidae															
►! <i>Anacamptis timidella</i> (Wocke, 1887)			1								1			5	S2
► <i>Psoricoptera gibbosella</i> (Zeller, 1839)				1	1			1	1					5	G
►! <i>Stenolechia gemmella</i> (Linnaeus, 1758)		1							2				1	5,6	S2
<i>Teleiodes decorellus</i> (Haworth, 1812)		1												5	G
Tortricidae															
►! <i>Aleimma loeflingiana</i> (Linnaeus, 1758)	25		20	11			21	1	10	14	2			4,5	S2
►! <i>Archips crataeganus</i> (Hübner, 1799)	2			1				1	2			2		5,6	G
<i>Archips podanus</i> (Scopoli, 1763)							1							5	G
►! <i>Eudemis profundana</i> (Denis et Schiffmüller, 1775)							1							5	S2
<i>Pammene albuginana</i> (Guenée, 1845)												1		5	S2
► <i>Pandemis cerasana</i> (Hübner, 1788)		2	4					1	7	2		3		5-7	G
► <i>Pandemis corylana</i> (Fabricius, 1794)		1		1				1						5	G
► <i>Pandemis heparana</i> (Denis et Schiffmüller, 1775)		1		1			3	1	1			3		5-7	G
► <i>Ptycholoma lecheanum</i> (Linnaeus, 1758)				1				1		1		1		5	G
<i>Spilonota ocellana</i> (Denis et Schiffmüller, 1775)		6	1											5	G
►! <i>Tortricodes alternella</i> (Denis et Schiffmüller, 1775)	6	4	6	3	2		3	10	2	2	7	4	6	5	G
►! <i>Tortrix viridana</i> (Linnaeus, 1758)	16	2	2	1			20			3		6		4,5	S2
► <i>Zelraphera isertana</i> (Fabricius, 1794)	6	1	3	1					2			4		4,5	S2
Pyralidae															
► <i>Conobathra repandana</i> (Fabricius, 1798)										1				5	S2
► <i>Conobathra tumidana</i> (Denis et Schiffmüller, 1775)							5	3	3		15	3	3	4,5	S2
► <i>Phioita roborella</i> (Denis et Schiffmüller, 1775)	3	1		3			1	2		2	4	2		4,5,9	S2
Lycanidae															
► <i>Neozephyrus quercus</i> (Linnaeus, 1758)	1		2	1					1			3		5	S2
Drepanidae															
► <i>Cymatophorina diluta</i> (Denis et Schiffmüller, 1775)											5			5	S2
► <i>Polyphoca ridens</i> (Fabricius, 1787)						1					4		2	5,6	S2
<i>Watsonalla binaria</i> (Hufnagel, 1767)		1	1				2			1				6,8,10	S3
Geometridae															
►! <i>Agriopsis aurantiana</i> (Hübner, 1799)	8	2	1	2			8	1	4	1	1	6		4-6	G
► <i>Agriopsis leucophaea</i> (Denis et Schiffmüller, 1775)	10	4	3	22	1		17	6	13	2	10	39	10	4,5	S3
► <i>Agriopsis marginaria</i> (Fabricius, 1776)	11	12	6	26	1		2	4	14	2	6	26		4,5	G
<i>Alicis repandata</i> (Linnaeus, 1758)									1					9	G
► <i>Aisophila aceraria</i> (Denis et Schiffmüller, 1775)	1	1		5			6	4	1	1	1	3	1	4,5	G
►! <i>Aisophila aesculana</i> (Denis et Schiffmüller, 1775)	16	6	1	6			12		10	4	1	14		4-6	G
► <i>Apocheima hispidatum</i> (Denis et Schiffmüller, 1775)							1							5	G
► <i>Apocheima pilosarium</i> (Denis et Schiffmüller, 1775)												1		5	G
<i>Biston betulana</i> (Linnaeus, 1758)			1	2	1		2						1	8-10	G
<i>Biston strataria</i> (Hufnagel, 1767)									1				2	5	G
► <i>Campaea margaritata</i> (Linnaeus, 1767)	6			1			3	1	4	5		6	3	4-8,11	G
►! <i>Colotois pennaria</i> (Linnaeus, 1761)	5	1		6		1	7	1	3	2	1	15	1	4,5	G
► <i>Cyclophora linearia</i> (Hübner, 1799)	1	9	14	8	5		7	6	11			13		6-10	S3
► <i>Cyclophora punctaria</i> (Linnaeus, 1758)		1							1					6,7	S3

<i>Cyclophora ruficollaria</i> (Herrich-Schäffer, 1855)						1	7		13	21	6-9	S2				
<i>Ectopis crepuscularia</i> (Denis et Schiffmüller, 1775)										1	6	G				
<i>Ennomos autumnarius</i> (Werneburg, 1859)		1					2		2		5-7	G				
<i>Ennomos erosarius</i> (Denis et Schiffmüller, 1775)	3		1	1							5,9	S3				
▶! <i>Ennomos quercinarius</i> (Hufnagel, 1787)			1					1			5,6	G				
▶ <i>Epirrita dilutata</i> (Denis et Schiffmüller, 1775)	4	22	2	3	1	1	1	1	3	1	7	4,5	G			
▶! <i>Erannis defoliaria</i> (Clerck, 1759)	6	6		2				1			3	4,5	G			
<i>Eupithecia abbreviata</i> Stephens, 1831										1	5	S2				
▶ <i>Hypomecis punctinalis</i> (Scopoli, 1763)	2			1		1					6	6-9	G			
<i>Hypomecis roboraria</i> (Denis et Schiffmüller, 1775)								1			5	S3				
<i>Lonographa temerata</i> (Denis et Schiffmüller, 1775)			3	2							2	7,8	G			
! <i>Lycia hirtaria</i> (Clerck, 1759)				1		1					2	5,6	G			
▶!! <i>Operophtera brumata</i> (Linnaeus, 1758)	37	65	17	26	2		34	15	29	7	4	42	6	4,5	G	
<i>Parectopis similaria</i> (Hufnagel, 1767)							2							7,10	G	
<i>Peribatodes rhomboidarius</i> (Denis et Schiffmüller, 1775)										1				11	G	
<i>Selenia lunularia</i> (Hübner, 1788)					1									6	G	
<i>Selenia tetralunaria</i> (Hufnagel, 1767)									1					6	G	
Notodontidae																
<i>Drymonia querna</i> (Denis et Schiffmüller, 1775)									2		3			7-9	S2	
! <i>Drymonia ruficornis</i> (Hufnagel, 1766)	1		4	1							4			5	S2	
<i>Harpyia mihauseri</i> (Fabricius, 1775)									1					7	G	
! <i>Phalera bucephala</i> (Linnaeus, 1758)						2	1				1			7	G	
<i>Spatalia argentina</i> (Denis et Schiffmüller, 1775)									1	1	1			6,7	G	
! <i>Thaumetopoea processionea</i> (Linnaeus, 1758)				2						1	20	1		5,6	S2	
Noctuidae																
<i>Acrionia aunicoma</i> (Denis et Schiffmüller, 1775)			2	1										5,6	G	
<i>Acrionia psi</i> (Linnaeus, 1758)						1								6	G	
<i>Agrochola helvola</i> (Linnaeus, 1758)										1				5	G	
<i>Amphipyra pyramidea</i> (Linnaeus, 1758)				1	5			1	1	1				5	G	
<i>Cosmia pyralina</i> (Denis et Schiffmüller, 1775)	17	7			2									7	4,5	G
▶ <i>Cosmia trapezina</i> (Linnaeus, 1758)	18	34	20	47		1	12	2	18		7	27	6	4,5	G	
▶ <i>Dichonia convergens</i> (Denis et Schiffmüller, 1775)	9	2	3	2			1	1		4		6		4,5	G	
<i>Ditoba caeruleocephala</i> (Linnaeus, 1758)													1	5	S3	
▶ <i>Dryobotodes eremita</i> (Fabricius, 1775)				7				1		1				5	S2	
<i>Dryobotodes monochroma</i> (Esper, 1790)						1		13			5		4	5	S2	
▶ <i>Eupstilia transversa</i> (Hufnagel, 1766)	2	8	2	1	2		5		1	4	1	3		4-6	G	
▶ <i>Lithophane omitopus</i> (Hufnagel 1766)	2	6	5	3			2		1	3	2	1	2	4-6	G	
<i>Moma alpium</i> (Osbeck, 1778)								1			1		2	7,8	G	
▶ <i>Orthosia cerasi</i> (Fabricius, 1775)	18	6		11		1	7	3	12		4	5	5	4-7	G	
▶ <i>Orthosia cruda</i> (Denis et Schiffmüller, 1775)	7	3	3	8		1	3	4			3	32	5	4-6	G	
<i>Orthosia gothica</i> (Linnaeus, 1758)			6	2						1	2	2		5,6	G	
<i>Orthosia incerta</i> (Hufnagel, 1776)			1			2					1		2	5,6	G	
<i>Orthosia opima</i> (Hübner, 1809)				4	11					1		13		4-6	G	
Noctuidae sp. 1											1			5	U	
Noctuidae sp. 2											1			5	U	
Noctuidae sp. 3											2			5	U	
Noctuidae sp. 4					3									4	U	
Noctuidae sp. 5					1									4	U	
Noctuidae sp. 6									3					9	U	
Noctuidae sp. 7	7													4	U	
Pantheidae																
▶ <i>Colocasia coryli</i> (Linnaeus, 1758)			1				1			1				6,8	G	
Lymantriidae																
▶! <i>Calliteara pudibunda</i> (Linnaeus, 1758)	4			3						1				6-8	G	
▶!! <i>Lymantria dispar</i> (Linnaeus, 1758)	53	5	5	37	13	13		3	4	24	9	16	12	4-7	G	
<i>Orgyia antiqua</i> (Linnaeus, 1758)												1	1	6,7	G	
Nolidae																
<i>Bena bicolorana</i> (Fuessly, 1775)	1	1		1						1			2	4,8,9	S2	
<i>Nyctecola revayana</i> (Scopoli, 1772)				1										5	S3	
▶ <i>Pseudopsis prasinanus</i> (Linnaeus, 1758)	4	12	5	9	3	1	2	1	2	2		5		6-10	G	
Arctiidae																
<i>Amata phegea</i> (Linnaeus, 1758)						1								4,5	G	
Total number of individuals	325	284	167	325	44	39	216	98	184	133	155	462	115	2547		
Total number of species	38	46	35	53	18	17	40	32	43	40	35	52	29			

Table 2. Sequence of species on the total abundance (species with total abundance => 10) on *Q. dalechampii*.

Species	Total abundance (9 study plots)	The average live mass of grown up caterpillar (grams)
<i>Operophtera brumata</i>	259	0.06
<i>Cosmia trapezina</i>	176	0.30
<i>Lymantria dispar</i>	157	1.37
<i>Agriopsis leucophaearia</i> *	111	0.12
<i>Aleinma loeflingiana</i>	101	0.03
<i>Agriopsis marginaria</i>	100	0.13
<i>Coleophora lutipennella</i>	86	0.005
<i>Cyclophora linearia</i> *	74	0.05
<i>Alsophila aescularia</i>	69	0.13
<i>Carcina quercana</i> *	62	0.05
<i>Orthosia cerasi</i>	59	0.45
<i>Orthosia cruda</i>	56	0.34
<i>Tortrix viridana</i>	50	0.06
<i>Epirrita dilutata</i>	44	0.14
<i>Pseudoips prasinanus</i> *	44	0.30
<i>Diurnea lipsiella</i>	36	0.07
<i>Cosmia pyralina</i> *	34	0.25
<i>Tortricodes alternella</i>	32	0.05
<i>Agriopsis aurantiaria</i> *	32	0.13
<i>Colotois pennaria</i>	32	0.50
<i>Orthosia opima</i> *	29	0.48
<i>Eupsilia transversa</i> *	28	0.50
<i>Dichonia convergens</i> *	27	0.40
<i>Ypsolopha alpella</i>	25	0.02
<i>Coleophora siccifolia</i> *	25	0.005
<i>Campaea margaritata</i> *	25	0.40
<i>Lithophane ornitopus</i>	23	0.48
<i>Thaumetopoea processionea</i>	22	0.25
<i>Pandemis cerasana</i> *	18	0.07
<i>Alsophila aceraria</i>	18	0.07
<i>Erannis defoliaria</i>	18	0.20
<i>Zeiraphera isertana</i>	17	0.02
<i>Phicita roborella</i> *	14	0.06
<i>Ypsolopha ustella</i>	13	0.02
<i>Diurnea fagella</i> *	13	0.07
<i>Conobathra tumidana</i>	11	0.05
<i>Orthosia gothica</i> *	11	0.45
<i>Drymonia ruficornis</i> *	10	0.48

Table 3. Sequence of species on the total abundance (species with total abundance => 10) on *Q. cerris*.

Species	Total abundance (4 study plots)	The average live mass of grown up caterpillar (grams)
<i>Cyclophora ruficiliaria</i> *	42	0.05
<i>Ypsolopha alpella</i>	39	0.02
<i>Lymantria dispar</i>	37	1.37
<i>Agriopsis leucophaearia</i> *	26	0.12
<i>Operophtera brumata</i>	25	0.06
<i>Tortricodes alternella</i>	23	0.05
<i>Dryobotodes monochroma</i> *	23	0.25
<i>Coleophora lutipennella</i>	22	0.005
<i>Conobathra tumidana</i>	21	0.05
<i>Cosmia trapezina</i>	16	0.30
<i>Orthosia cerasi</i>	13	0.45
<i>Orthosia cruda</i>	13	0.34
<i>Agriopsis marginaria</i>	10	0.13

Leaf area consumed (m²)

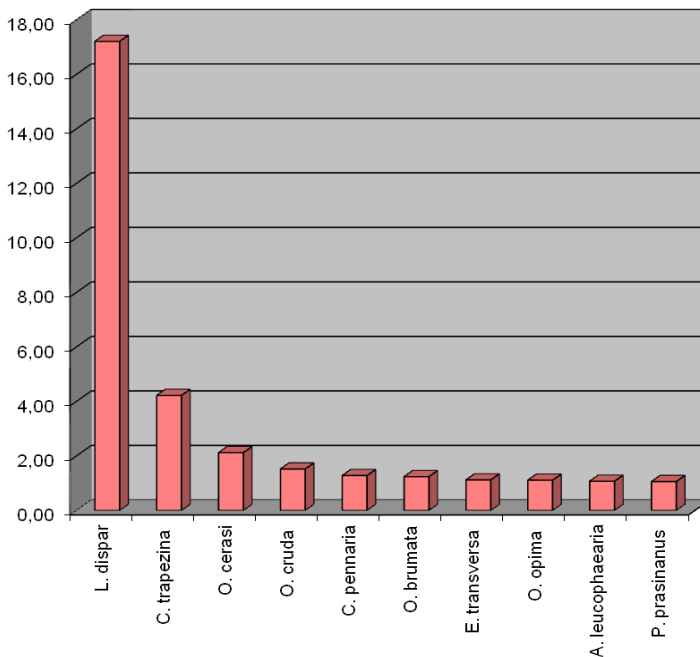


Figure 1. Sequence of the first 10 species on *Q. dalechampii* based on the leaf area consumed.

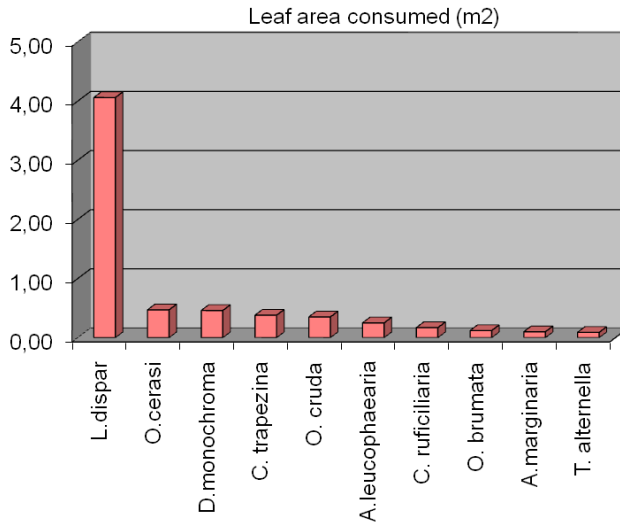


Figure 2. Sequence of the first 10 species on *Q. cerris* based on the leaf area consumed.