

**CONTRIBUTION TO THE FAUNA OF LEPIDOPTERA OF THE  
MAVROVO NATIONAL PARK (REPUBLIC OF MACEDONIA)**

P. HUEMER<sup>1</sup>, V. KRPAČ<sup>2</sup>, B. PLÖSSL<sup>3</sup>, G. TARMANN<sup>1</sup>

<sup>1</sup> Naturwissenschaftliche Sammlungen, Tiroler Landesmuseen  
Betriebsges.m.b.H., Feldstr. 11a, A-6020 Innsbruck, Austria. p.huemer@tiroler-  
landesmuseen.at; g.tarmann@tiroler-landesmuseen.at

<sup>2</sup> National Institution Macedonian Museum of Natural History, Boulevard  
Ilinden 86, 1000 Skopje, Republic of Macedonia. vkrpach@gmail.com

<sup>3</sup> Bruneckerstraße 2c, A-6020 Innsbruck, Austria.

**Abstract** - A short-term faunistic survey of Lepidoptera of the Mavrovo National Park (Republic of Macedonia) resulted in records of 401 species of Lepidoptera, almost twice as much as hitherto known from this area. Of particular interest are 48 species which, according to Fauna Europaea, are new country records. Furthermore, 4 species are probably new to science.

**KEY WORDS:** faunistics, new records, Lepidoptera, Mavrovo National Park, Republic of Macedonia

**Izvešček** - PRISPEVEK K FAVNI METULJEV MAVROVSKEGA NARODNEGA PARKA (REPUBLIKA MAKEDONIJA)

Kratkotrajna favnistična raziskava metuljev (Lepidoptera) Mavrovskega narodnega parka v Republiki Makedoniji je dala podatke o 401 vrsti metuljev, skoraj dvakrat toliko, kot jih je bilo s tega območja znanih poprej. Posebno zanimivih je 48 vrst, ki po bazi podatkov Fauna Europaea za državo se niso bile znane. Štiri vrste pa so verjetno nove za znanost.

**KLJUČNE BESEDE:** favnistika, nove najdbe, Lepidoptera, Mavrovski narodni park, Republika Makedonija

## Introduction

The lepidopterological exploration of Macedonia has a long tradition, reflected by 4 volumes dealing with the fauna of this country (Turner 1964, Daniel 1964, Pinker 1968, Klimesch 1968). Though partially out of date, these outstanding reviews are together with other historical and recently published sources (e.g. Michieli 1963, Rebel & Zerny 1931, Schaider & Jaksic 1989, Verovnik et al. 2010) still of major importance when dealing with the faunistics of this country. However, the level of exploration varies much within Macedonia as most of the Lepidopterologists devoted their time to the southern, central and eastern part of the country, whereas the north-western part was largely neglected, probably because of difficulties in accession. As a consequence the largest National Park of the country, Mavrovo, which covers 73,088 ha and includes the highest peak of Macedonia, Korab (2764 m a.s.l.), is insufficiently explored. Only 201 species of Lepidoptera have been recorded from this area so far, the majority belonging to butterflies s.l. with 123 taxa (Krpac & Lazarevska 2008, Krpac 2010, Leone & Puccioni 2009).

These shortcomings combined with a general interest in the alpine element of the Macedonian fauna ended up in the organization of a week-long trip to Mavrovo National Park lasting from 28<sup>th</sup> of July to 3<sup>rd</sup> of August 2011.

## Methods and material

Our field research lasted from 28<sup>th</sup> of July 2011 (evening) to 3<sup>rd</sup> of August (morning). The weather conditions were quite unfavourable with regular thunderstorms in the late afternoon (or at other times of the day), cloudless sky in the night and thus wet vegetation and chilly temperatures as low as 4° C. Furthermore, the field research was with few exceptions hindered by strong wind in the night.

To ensure a maximum of species records we relied on a variety of different methods. As we expected the majority of species to be nocturnal, several different types of light traps were used more or less simultaneously for our field work: 2 light towers (15 W UV), 1-2 illuminated white sheets (125 W UV), 2-3 automatic light traps (15 W black light). Due to bad weather conditions light trapping usually only lasted until about midnight with the exception of the automatic traps which ran all the night. Diurnal species were collected with a butterfly net during sunshine and by sweeping vegetation at dusk. Finally leaf-miners were collected during the day.

Voucher specimens of most species were collected, pinned and spread in the field and it is planned that Barcodes will be sequenced at a later stage. Identification of species is usually based on phenotypical appearance. However, of several critical taxa we made genitalia slides to assure identification. The major part of the material is stored in the Natural History Collections of the Tiroler Landesmuseum Ferdinandeum, Innsbruck, Austria.

## Site descriptions

### 28.7.2011-1.8.2011

1. Korab, Korabska jezero, Kobilino pole, 2080-2180 m (camp and main collecting area at 2100 m, N 41°46'42" / E 20°34'55") (Fig. 1). Alpine grassland on crystalline schist that is frequently mixed with limestone.

2. Korab, eastern ridge, ca. 2325-2400 m (about 200 m around crest on marked track, N 41°47'08" / E 20°34'46") (Fig. 2). Rocks with Alpine-cushion vegetation mixed with Alpine grassland, partly on crystalline schist and on limestone.

3. Korab, summit ridge, ca. 2700-2750 m (N 41°47'20" / E 20°32'48") (Fig. 3). Rocks with alpine-cushion vegetation mixed with Alpine grassland, mainly limestone (summit area) but also spots with crystalline schist at southern part of the ridge.

### 1.8.2011-3.8.2011

4. Radika valley, around bridge 10 km NNW Sveta Voda, 1290-1340 m (N 41°47'51" / E 20°37'53") (Fig. 4). Schistaceous crystalline rocks and rocky scree mixed with breccie, strongly covered with lichens, bushy *Fagus-Ostrya-forest* with some *Pinus* and *Abies* on the slopes, *Salix* near the river; on the steep schistaceous rocks *Juniperus sabina*, dry open slopes with very rich mixed flowery vegetation.



**Fig. 1.** Korab, ca. 2100 m, camp and main collecting area.



**Fig. 2.** Korab, eastern ridge, ca. 2400 m.



**Fig. 3.** Korab, summit ridge, ca. 2700-2750 m.



**Fig. 4.** Radika valley, ca. 1300 m.



**Fig. 5.** *Autographa aemula*, new record for the Balkan Peninsula.

## Results

Altogether 401 species of Lepidoptera from 37 families were recorded including 48 new records for the Republic of Macedonia (according to Fauna Europaea), and furthermore 4 species probably new to science. The vast majority of species belong to nocturnal families and only 52 taxa are butterflies s.l. (Papilionoidea and Hesperioidea). The species are listed in Table 1 together with localities.

The taxonomy of the checklist with few exceptions follows the new version of Fauna Europaea (<http://faunaeur.org>) published in 2010. The systematic arrangement mainly follows ID numbers supplied by the management of Fauna Europaea.

**Table 1.** Records of Lepidoptera from the Mavrovo National Park, 28.7.2011-3.8.2011.

Abbreviations: \* = new country record; ! = (probably) new species to science; 1 = Korab, 2080-2180 m; 2 = Korab, 2325-2400 m; 3 = Korab, 2700-2750 m; 4 = Radika valley NNW Sveta Voda, 1290-1340 m.

<b>Micropterigidae</b>			
* <i>Micropterix aruncella</i> (Scopoli, 1763)	1		
* <i>Paracrania chrysolepidella</i> (Zeller, 1851)			4
<b>Hepialidae</b>			
<i>Triodia sylvina</i> (Linnaeus, 1761)	1		
<b>Nepticulidae</b>			
<i>Stigmella microtheriella</i> (Stainton, 1854)			4
* <i>Stigmella salicis</i> (Stainton, 1854)			4
* <i>Stigmella hemargyrella</i> (Kollar, 1832)			4
<b>Adelidae</b>			
* <i>Nemophora minimella</i> (Denis & Schiff., 1775)	1		
<b>Tineidae</b>			
<i>Monopis laevigella</i> (Denis & Schiff., 1775)			4
<i>Tinea trinotella</i> Thunberg, 1794			4
<i>Infurcitinea albanica</i> Petersen, 1963	1		
<b>Psychidae</b>			
<i>Dahlica</i> sp.		2	
<i>Typhonia ciliaris</i> (Ochsenheimer, 1810)		2	
<b>Gracillariidae</b>			
* <i>Phyllonorycter aemula</i> Trib., D. & Huemer, 1997			4
<i>Phyllonorycter maestingella</i> (Müller, 1764)			4
<i>Parornix carpinella</i> (Frey, 1863)			4
<i>Parornixfagivora</i> (Frey, 1861)			4
<i>Euspilapteryx auroguttella</i> Stephens, 1835			4
<i>Aspilapteryx limosella</i> (Duponchel, 1843)			4
<b>Yponomeutidae</b>			

* <i>Argyresthia pygmaeella</i> (Denis & Schiff., 1775)				4
<i>Argyresthia pruniella</i> (Clerck, 1759)				4
* <i>Yponomeuta cagnagella</i> (Hübner, 1813)				4
<b>Plutellidae</b>				
<i>Plutella xylostella</i> (Linnaeus, 1758)		2	3	
! <i>Plutella</i> sp.		2		
<i>Rhigognostis wolfschlaegeri</i> (Rebel, 1940)	1			
<b>Acrolepiidae</b>				
<i>Digitivalva granitella</i> (Treitschke, 1833)				4
<b>Lyonetiidae</b>				
<i>Lyonetia clerkella</i> (Linnaeus, 1758)				4
<b>Depressariidae</b>				
* <i>Agonopterix scopariella</i> (Heinemann, 1870)	1			
* <i>Agonopterix nervosa</i> (Haworth, 1811)	1			4
! <i>Exaeretia</i> sp.	1			
* <i>Orophia zernyi</i> (Szent-Ivany, 1942)	1			
<i>Anchinia laureolella</i> Herrich-Schäffer, 1854	1			
<b>Scythrididae</b>				
* <i>Scythris similis</i> Hannemann, 1961	1			
<b>Elachistidae</b>				
<i>Elachista</i> sp. 1	1			
<i>Elachista</i> sp. 2	1			
<b>Oecophoridae</b>				
<i>Borkhausenia fuscescens</i> (Haworth, 1828)				4
<i>Metalampra cinnamomea</i> (Zeller, 1839)	1			
<b>Coleophoridae</b>				
<i>Coleophora lineolea</i> (Haworth, 1828)		2		
* <i>Coleoephora chamaedriella</i> Bruand, 1852				4
* <i>Coleophora auricella</i> (Fabricius, 1794)				4
<i>Coleophora ornatipennella</i> (Hübner, 1796)				4
* <i>Coleophora trochilella</i> (Duponchel, 1843)				4
<i>Coleophora nubivagella</i> Zeller, 1849			3	
<i>Coleophora</i> sp. 1	1			
<i>Coleophora</i> sp. 2	1			
<i>Coleophora</i> sp. 3				4
<b>Momphidae</b>				
* <i>Mompha sturnipennella</i> (Treitschke, 1833)				4
<b>Gelechiidae</b>				
<i>Eulamprotes wilkella</i> (Linnaeus, 1758)				4
* <i>Monochroa lutulentella</i> (Zeller, 1839)				4
<i>Metzneria neuropterella</i> (Zeller, 1839)	1			
<i>Isophrictis striatella</i> (Denis & Schiff., 1775)				4
<i>Aristotelia decurtella</i> (Hübner, 1813)				4

<i>Megacraspedus dolosellus</i> (Zeller, 1839)	1	2		
* <i>Megacraspedus separatellus</i> (F. v. R., 1843)	1			
* <i>Megacraspedus incertellus</i> Rebel, 1930		2		
<i>Megacraspedus binotella</i> (Duponchel, 1843)	1	2		
<i>Teleiopsis bagriotella</i> (Duponchel, 1840)	1			
<i>Teleiopsis laetitiae</i> Müller, 2011	1			
<i>Teleiopsis rosalbella</i> (Fologne, 1862)				4
<i>Recurvaria leucateella</i> (Clerck, 1759)				4
<i>Prolita sexpunctella</i> (Fabricius, 1794)			3	
<i>Prolita solutella</i> (Zeller, 1839)	1			
<i>Chionodes distinctella</i> (Zeller, 1839)	1			
<i>Sophronia sicariellus</i> (Zeller, 1839)				4
<i>Mirificarma maculatella</i> (Hübner, 1796)				4
<i>Gelechia scotinella</i> Herrich-Schäffer, 1854				4
<i>Gelechia senticetella</i> (Staudinger, 1859)				4
* <i>Gelechia sororculella</i> (Hübner, 1817)				4
<i>Caryocolum tischeriella</i> (Zeller, 1839)				4
* <i>Caryocolum amaurella</i> (M. Hering, 1924)	1			
<i>Caryocolum peregrinella</i> (Herrich-Schäffer, 1854)	1			
<i>Caryocolum leucomelanella</i> (Zeller, 1839)	1			
<i>Caryocolum schleichi</i> (Christoph, 1872)	1			
<i>Caryocolum marmoreum</i> (Haworth, 1828)	1			
<i>Caryocolum petrophilum</i> (Preissecker, 1914)	1			
<i>Ephysteris diminutella</i> (Zeller, 1847)	1			
<i>Scrobipalpa acuminatella</i> (Sircom, 1850)	1			
<i>Scrobipalpa artemisiella</i> (Treitschke, 1833)	1			4
* <i>Scrobipalpa samadensis</i> (Pfaffenzeller, 1870)	1			
<i>Scrobipalpa vasconiella</i> (Rössler, 1877)				4
<i>Approaerema anthyllidella</i> (Hübner, 1813)				4
* <i>Syncopacma sangiella</i> (Stainton, 1863)	1			
<i>Syncopacma cinctella</i> (Clerck, 1759)	1			
* <i>Stomopteryx flavipalpella</i> Jäckh, 1959				4
<i>Nothris verbascella</i> (Denis & Schiff., 1775)	1			
<i>Anarsia spartiella</i> (Schränk, 1802)	1			
* <i>Thiotricha majorella</i> (Rebel, 1910)	1			4
<i>Acompsia cinerella</i> (Clerck, 1759)	1			4
<i>Acompsia ponomarenkoae</i> Huemer & Kars., 2002	1			
<i>Brachmia dimidiella</i> (Denis & Schiff., 1775)		2		
<b>Zygaenidae</b>				
<i>Zygaena carniolica</i> (Scopoli, 1763)				4
<i>Zygaena loti</i> (Denis & Schiff., 1775)				4
<i>Zygaena viciae</i> (Denis & Schiff., 1775)				4
<i>Zygaena ephialtes</i> (Linnaeus, 1767)				4



<i>Zygaena angelicae</i> Ochsenheimer, 1808	1		
<i>Zygaena filipendulae</i> (Linnaeus, 1758)			4
<i>Zygaena lonicerae</i> (Scheven, 1777)			4
<b>Sesiidae</b>			
<i>Synanthedon stomoxiformis</i> (Hübner, 1790)			4
<b>Tortricidae</b>			
<i>Celypha lacunana</i> (Denis & Schiff., 1775)			4
* <i>Celypha rivulana</i> (Scopoli, 1763)	1		
<i>Hedya nubiferana</i> (Haworth, 1811)			4
<i>Notocelia roborana</i> (Denis & Schiff., 1775)			4
<i>Eucosma</i> sp.	1		
* <i>Rhopobota stagnana</i> (Denis & Schiff., 1775)		2	
<i>Lathronympha strigana</i> (Fabricius, 1775)	1		
<i>Cydia succedana</i> (Denis & Schiff., 1775)	1		
<i>Cydia fagiglandana</i> (Zeller, 1841)	1		
* <i>Dichrorampha montanana</i> (Duponchel, 1843)	1		
! <i>Dichrorampha</i> sp. 1	1	2	
! <i>Dichrorampha</i> sp. 2			3
* <i>Cochylis flaviciliana</i> (Westwood, 1854)	1		
<i>Cochylis hybridella</i> (Hübner, 1813)			4
<i>Aethes tessera</i> (Denis & Schiff., 1775)			4
* <i>Aethes cnicana</i> (Westwood, 1854)	1	2	
<i>Agapeta zoegana</i> (Linnaeus, 1767)	1		4
* <i>Phtheochroa drenowskyi</i> (Rebel, 1916)		2	
<i>Cnephasia asseclana</i> (Denis & Schiff., 1775)			4
<i>Eana argentana</i> (Clerck, 1759)	1		
<i>Eana canescana</i> (Guenée, 1845)	1		4
<i>Clepsia balcanica</i> (Rebel, 1917)	1		
<i>Aphelia viburnana</i> (Denis & Schiff., 1775)	1		
<i>Pandemis cerasana</i> (Hübner, 1786)			4
<i>Archips xylostearia</i> (Linnaeus, 1758)			4
<b>Epermeniidae</b>			
<i>Ochromolopis ictella</i> (Hübner, 1813)			3
<i>Epermenia aequidentellus</i> (O. Hofmann, 1867)			4
<i>Epermenia pontificella</i> (Hübner, 1796)		2	
<b>Pterophoridae</b>			
* <i>Hellinsia osteodactylus</i> (Zeller, 1841)			4
<i>Merrifieldia leucodactyla</i> (Denis & Schiff., 1775)	1		4
<i>Calyciphora nephelodactyla</i> (Eversmann, 1844)			4
* <i>Geina didactyla</i> (Linnaeus, 1758)	1		
<i>Stenoptilia pterodactyla</i> (Linnaeus, 1761)			4
<i>Stenoptilia lutescens</i> (Herrich-Schäffer, 1855)	1		
* <i>Stenoptilia coprodactylus</i> (Stainton, 1851)	1		

<i>Stenoptilia</i> sp.	1		
<i>Gillmeria ochrodactyla</i> (Denis & Schiff., 1775)	1		4
<i>Gillmeria miantodactylus</i> (Zeller, 1841)	1		
* <i>Platyptilia gonodactyla</i> (Denis & Schiff., 1775)	1		
<i>Platyptilia farfarellus</i> Zeller, 1867			4
<b>Pyralidae</b>			
<i>Aphomia sociella</i> (Linnaeus, 1758)			4
<i>Phycitodes saxicola</i> (Vaughan, 1870)			4
<i>Bradyrrhoa gilveolella</i> (Treitschke, 1832)			4
<i>Hypochalcia ahenella</i> (Denis & Schiff., 1775)	1		
<i>Dioryctria abietella</i> (Denis & Schiff., 1775)			4
<i>Moitrelia obductella</i> (Zeller, 1839)			4
<i>Pempeliella ornatella</i> (Denis & Schiff., 1775)	1		
<b>Crambidae</b>			
* <i>Catoptria myella</i> (Hübner, 1796)			4
<i>Catoptria acutangulellus</i> (Herrich-Schäffer, 1847)	1		4
<i>Catoptria pauperellus</i> (Treitschke, 1832)	1		
<i>Catoptria mytilella</i> (Hübner, 1805)			4
<i>Catoptria languidellus</i> (Zeller, 1863)	1	2	
<i>Catoptria falsella</i> (Denis & Schiff., 1775)			4
<i>Catoptria confusellus</i> (Staudinger, 1882)	1		4
<i>Catoptria kasyi</i> Bleszynski, 1960	1	2	
<i>Agriphila straminella</i> (Denis & Schiff., 1775)	1		4
<i>Crambus pascuella</i> (Linnaeus, 1758)			4
<i>Eudonia petrophila</i> (Standfuss, 1848)	1		
<i>Eudonia phaeoleuca</i> (Zeller, 1846)	1		4
<i>Scoparia manifestella</i> (Herrich-Schäffer, 1848)	1		4
<i>Scoparia perplexella</i> (Zeller, 1839)	1		4
<i>Scoparia pyralella</i> (Denis & Schiff., 1775)	1		
<i>Palpita vitrealis</i> (Rossi, 1794)	1		
<i>Paratalanta hyalinalis</i> (Hübner, 1796)			4
<i>Pyrausta castalis</i> Treitschke, 1829			4
<i>Pyrausta aurata</i> (Scopoli, 1763)			4
<i>Pyrausta aerealis</i> (Hübner, 1793)	1	3	4
<i>Udea lutealis</i> (Hübner, 1809)	1		4
<i>Udea alpinalis</i> (Denis & Schiff., 1775)			3
<i>Udea rhododendronalis</i> (Duponchel, 1834)		2	3
<i>Udea austriacalis</i> (Herrich-Schäffer, 1851)	1		4
<i>Udea uliginosalis</i> (Stephens, 1834)		2	
<i>Udea olivalis</i> (Denis & Schiff., 1775)			4
<i>Oreanaia alpestralis</i> (Fabricius, 1787)			3
<i>Evergestis sophialis</i> (Fabricius, 1787)	1		4
<i>Evergestis limbata</i> (Linnaeus, 1767)			4

<i>Evergestis aenealis</i> (Denis & Schiff., 1775)	1		
<i>Metaxmeste phrygialis</i> (Hübner, 1796)	1		3
<i>Cynaeda dentalis</i> (Denis & Schiff., 1775)	1		
<i>Platytes cerussella</i> (Denis & Schiff., 1775)	1		
<b>Lasiocampidae</b>			
<i>Macrothylacia rubi</i> (Linnaeus, 1758)	1		
<i>Malacosoma neustria</i> (Linnaeus, 1758)			4
<i>Malacosoma castrense</i> (Linnaeus, 1758)	1		4
<b>Sphingidae</b>			
<i>Macroglossum stellatarum</i> (Linnaeus, 1758)	1		4
<i>Deilephila porcellus</i> (Linnaeus, 1758)	1		
<i>Hyles euphorbiae</i> (Linnaeus, 1758)	1		
<i>Hyles vespertilio</i> (Esper, 1780)			4
<i>Hyles livornica</i> (Esper, 1780)	1	2	
<i>Agrius convolvuli</i> (Linnaeus, 1758)	1	2	
<i>Laothoe populi</i> (Linnaeus, 1758)			4
<i>Smerinthus ocellatus</i> (Linnaeus, 1758)			4
<b>Hesperiidae</b>			
<i>Ochlodes sylvanus</i> (Esper, 1777)			4
<i>Thymelicus lineola</i> (Ochsenheimer, 1808)			4
<b>Papilionidae</b>			
<i>Papilio machaon</i> Linnaeus, 1758			4
<i>Parnassius mnemosyne</i> (Linnaeus, 1758)	1		
<i>Parnassius apollo</i> (Linnaeus, 1758)	1		4
<b>Pieridae</b>			
<i>Colias croceus</i> (Fourcroy, 1785)	1		4
<i>Gonepteryx rhamni</i> (Linnaeus, 1758)			4
<i>Pieris brassicae</i> (Linnaeus, 1758)			4
<i>Pieris mannii</i> (Mayer, 1851)			4
<i>Aporia crataegi</i> (Linnaeus, 1758)			4
<b>Lycaenidae</b>			
<i>Chrysophanus phlaeoides</i> Staudinger, 1901	1		
<i>Lycaena virgaureae</i> (Linnaeus, 1758)			4
<i>Satyrrium spini</i> (Denis & Schiff., 1775)			4
<i>Polyommatus semiargus</i> (Rottemburg, 1775)		2	
<i>Polyommatus daphnis</i> (Denis & Schiff., 1775)			4
<i>Polyommatus bellargus</i> (Rottemburg, 1775)			4
<i>Polyommatus coridon</i> (Poda, 1761)			4
<i>Polyommatus damon</i> (Denis & Schiff., 1775)	1		4
<i>Plebejus argus</i> (Linnaeus, 1758)	1		
<i>Plebejus eumedon</i> (Esper, 1780)	1		
<i>Phengaris arion</i> (Linnaeus, 1758)			4
<i>Celastrina argiolus</i> (Linnaeus, 1758)			4

<i>Cupido minimus</i> (Fuessly, 1775)				4
<i>Leptotes piritheus</i> (Linnaeus, 1767)				4
<b>Nymphalidae</b>				
<i>Nymphalis antiopa</i> (Linnaeus, 1758)				4
<i>Nymphalis polychloros</i> (Linnaeus, 1758)				4
<i>Aglais urticae</i> (Linnaeus, 1758)	1			
<i>Inachis io</i> (Linnaeus, 1758)				4
<i>Melitaea didyma</i> (Esper, 1778)	1			4
<i>Melitaea athalia</i> (Rottemburg, 1775)				4
<i>Limenitis reducta</i> Staudinger, 1901				4
<i>Apatura iris</i> (Linnaeus, 1758)				4
<i>Vanessa atalanta</i> (Linnaeus, 1758)	1			4
<i>Vanessa cardui</i> (Linnaeus, 1758)	1			
<i>Boloria graeca</i> (Staudinger, 1870)	1			
<i>Brenthis daphne</i> (Bergsträsser, 1780)				4
<i>Issoria lathonia</i> (Linnaeus, 1758)				4
<i>Argynnis paphia</i> (Linnaeus, 1758)				4
<i>Argynnis niobe</i> (Linnaeus, 1758)				4
<i>Lasiommata maera</i> (Linnaeus, 1758)				4
<i>Coenonympha rhodopensis</i> Elwes, 1900	1			
<i>Coenonympha arcania</i> (Linnaeus, 1761)				4
<i>Hyponephele lupinus</i> (O. Costa, 1836)				4
<i>Maniola jurtina</i> (Linnaeus, 1758)				4
<i>Erebia ligea</i> (Linnaeus, 1758)				4
<i>Erebia euryale</i> (Esper, 1805)	1			
<i>Erebia epiphron</i> (Knoch, 1783)	1		3	
<i>Erebia ottomana</i> Herrich-Schäffer, 1847	1			
<i>Erebia melas</i> (Herbst, 1796)	1			
<i>Erebia oeme</i> (Hübner, 1804)	1		3	
<i>Erebia pandrose</i> (Borkhausen, 1788)			3	
<i>Melanargia galathea</i> (Linnaeus, 1758)	1			4
<b>Drepanidae</b>				
<i>Watsonalla binaria</i> (Hufnagel, 1767)				4
<i>Thyatira batis</i> (Linnaeus, 1758)				4
<b>Geometridae</b>				
<i>Idaea serpentata</i> (Hufnagel, 1767)	1			
<i>Idaea aversata</i> (Linnaeus, 1758)				4
<i>Idaea straminata</i> (Borkhausen, 1794)				4
<i>Rhodostrophia vibicaria</i> (Clerck, 1759)	1			4
<i>Scopula immorata</i> (Linnaeus, 1758)	1			
<i>Scopula ornata</i> (Scopoli, 1763)				4
<i>Scopula submutata</i> (Treitschke, 1828)	1			4
<i>Scopula incanata</i> (Linnaeus, 1758)	1	2		4

<i>Schistostege decussata</i> (Denis & Schiff., 1775)				4
<i>Odezia atrata</i> (Linnaeus, 1758)	1			
<i>Aplocera praeformata</i> (Hübner, 1826)	1			4
<i>Aplocera simpliciata</i> (Treitschke, 1835)	1	2	3	
<i>Colostygia aptata</i> (Hübner, 1813)	1			
<i>Colostygia olivata</i> (Denis & Schiff., 1775)	1			
<i>Colostygia aqueata herzegovinensis</i> (Rebel, 1901)	1			4
<i>Thera cognata</i> (Thunberg, 1792)	1			
<i>Cidaria fulvata</i> (Forster, 1771)				4
<i>Gandaritis pyraliata</i> (Denis & Schiff., 1775)	1	2		4
<i>Eulithis prunata</i> (Linnaeus, 1758)				4
<i>Nebula achromaria</i> (de La Harpe, 1853)	1	2		
<i>Cosmorhoe ocellata</i> (Linnaeus, 1758)				4
* <i>Euphyia biangulata</i> (Haworth, 1809)				4
<i>Euphyia frustata</i> (Treitschke, 1828)	1			
<i>Eupithecia carpophagata</i> Staudinger, 1871		2		
<i>Eupithecia pusillata</i> (Denis & Schiff., 1775)				4
<i>Eupithecia cretaceata</i> (Packard, 1874)	1			
<i>Eupithecia icterata</i> (de Villers, 1789)	1			4
* <i>Eupithecia succenturiata</i> (Linnaeus, 1758)				4
<i>Eupithecia impurata</i> (Hübner, 1813)				4
<i>Hydriomena furcata</i> (Thunberg, 1784)				4
<i>Entephria cyanata</i> (Hübner, 1809)	1			
<i>Entephria flavicinctata</i> (Hübner, 1813)	1			
<i>Horisme vitalbata</i> (Denis & Schiff., 1775)				4
<i>Perizoma hydrata</i> (Treitschke, 1829)	1			
<i>Perizoma minorata</i> (Treitschke, 1828)	1			
* <i>Epilobophora sabinata</i> (Geyer, 1831)				4
<i>Epirrhoe rivata</i> (Hübner, 1813)				4
<i>Epirrhoe galiata</i> (Denis & Schiff., 1775)	1			4
<i>Catarhoe cuculata</i> (Hufnagel, 1767)				4
<i>Xanthorhoe fluctuata</i> (Linnaeus, 1758)	1			
<i>Scotopteryx luridata</i> (Hufnagel, 1767)	1			
<i>Scotopteryx bipunctaria</i> (Denis & Schiff., 1775)				4
<i>Scotopteryx moeniata</i> (Scopoli, 1763)	1			
<i>Scotopteryx chenopodiata</i> (Linnaeus, 1758)				4
<i>Thetidia smaragdaria</i> (Fabricius, 1787)				4
<i>Geometra papilionaria</i> (Linnaeus, 1758)				4
<i>Cleorodes lichenaria</i> (Hufnagel, 1767)				4
<i>Alcis repandata</i> (Linnaeus, 1758)	1			4
<i>Peribatodes secundaria</i> (Denis & Schiff., 1775)				4
<i>Campaea margaritaria</i> (Linnaeus, 1761)	1	2		4
<i>Pseudopanthera macularia</i> (Linnaeus, 1758)	1			4

<i>Siona lineata</i> (Scopoli, 1763)	1	2	4
<i>Charissa glaucinaria</i> (Hübner, 1799)	1		
<i>Charissa pullata</i> (Denis & Schiff., 1775)			4
<i>Charissa obscurata</i> (Denis & Schiff., 1775)			4
<i>Charissa certhiatus</i> (Rebel & Zerny, 1931)	1		4
<i>Gnophos obfuscata</i> (Denis & Schiff., 1775)	1		
<i>Macaria fusca</i> (Thunberg, 1792)			3
* <i>Macaria liturata</i> (Clerck, 1759)			4
* <i>Macaria artestaria</i> (Denis & Schiff., 1775)			4
<i>Ourapteryx sambucaria</i> (Linnaeus, 1758)			4
<b>Notodontidae</b>			
* <i>Thaumetopoea pityocampa</i> (Denis & Schiff., 1775)	1		
<i>Phalera bucephala</i> (Linnaeus, 1758)			4
<i>Pterostoma palpina</i> (Clerck, 1759)			4
<b>Erebidae</b>			
<i>Leucoma salicis</i> (Linnaeus, 1758)			4
<i>Lymantria monacha</i> (Linnaeus, 1758)			4
<i>Euplagia quadripunctaria</i> (Poda, 1761)			4
<i>Callimorpha dominula</i> (Linnaeus, 1758)			4
<i>Arctia caja</i> (Linnaeus, 1758)			4
<i>Rhyparia purpurata</i> (Linnaeus, 1758)	1		4
<i>Chelis maculosa</i> (Gerning, 1780)	1		
<i>Dysauxes ancilla</i> (Linnaeus, 1767)			4
<i>Amata kruegeri</i> (Ragusa, 1904)			4
<i>Setina irrorella</i> (Linnaeus, 1758)	1	2	4
<i>Eilema lurideola</i> (Zincken, 1817)			4
<i>Eilema complana</i> (Linnaeus, 1758)			4
<i>Lithosia quadra</i> (Linnaeus, 1758)			4
<i>Hypena proboscidalis</i> (Linnaeus, 1758)			4
<i>Hypena obesalis</i> Treitschke, 1829	1		
<i>Orectis proboscidata</i> (Herrich-Schäffer, 1851)			4
<i>Calyptra thalictri</i> (Borkhausen, 1790)			4
<i>Drasteria cailino</i> (Lefèbvre, 1827)			4
<i>Lygephila lusoria</i> (Linnaeus, 1758)			4
<i>Euclidia glyphica</i> (Linnaeus, 1758)			3 4
<i>Euclidia mi</i> (Clerck, 1759)			4
<i>Scoliopteryx libatrix</i> (Linnaeus, 1758)		2	
<b>Noctuidae</b>			
<i>Panchrysia deaurata</i> (Esper, 1787)	1		
<i>Diachrysia chrysitis</i> (Linnaeus, 1758)	1		4
<i>Autographa gamma</i> (Linnaeus, 1758)	1		4
<i>Autographa jota</i> (Linnaeus, 1758)	1		4
* <i>Autographa bractea</i> (Denis & Schiff., 1775)	1		4
* <i>Autographa aemula</i> (Denis & Schiff., 1775)	1		

<i>Abrostola triplasia</i> (Linnaeus, 1758)	1		
<i>Colocasia coryli</i> (Linnaeus, 1758)			4
<i>Peridroma saucia</i> (Hübner, 1808)	1	2	
<i>Euxoa decora</i> (Denis & Schiff., 1775)	1		4
<i>Dichagyris renigera</i> (Hübner, 1808)			4
* <i>Dichagyris celsicola</i> (Bellier, 1859)	1		
<i>Agrotis ipsilon</i> (Hufnagel, 1766)	1		
<i>Agrotis clavis</i> (Hufnagel, 1766)	1		
* <i>Xestia triangulum</i> (Hufnagel, 1766)			4
<i>Xestia ashworthii</i> (Doubleday, 1855)	1		4
<i>Xestia baja</i> (Denis & Schiff., 1775)	1		
<i>Xestia ochreago</i> (Hübner, 1809)	1	2	
<i>Standfussiana lucerneae</i> (Linnaeus, 1758)	1	2	
<i>Noctua pronuba</i> (Linnaeus, 1758)	1		
<i>Noctua interposita</i> (Hübner, 1790)			4
<i>Noctua fimbriata</i> (Schreber, 1759)	1		4
<i>Epipsilia grisescens</i> (Fabricius, 1794)	1	2	
* <i>Chersotis anatolica</i> (Draudt, 1936)		2	
<i>Chersotis cuprea</i> (Denis & Schiff., 1775)	1		
<i>Helicoverpa armigera</i> (Hübner, 1808)	1		
<i>Photodes minima</i> (Haworth, 1809)			4
<i>Oligia strigilis</i> (Linnaeus, 1758)			4
<i>Mesoligia furuncula</i> (Denis & Schiff., 1775)	1		4
<i>Apamea monoglypha</i> (Hufnagel, 1766)	1		4
<i>Apamea lithoxylaea</i> (Denis & Schiff., 1775)	1		
<i>Apamea lateritia</i> (Hufnagel, 1766)	1		4
<i>Apamea furva</i> (Denis & Schiff., 1775)	1		4
<i>Apamea maillardi</i> (Geyer, 1834)	1	2	
<i>Apamea zeta</i> (Treitschke, 1825)	1	2	
<i>Apamea rubrivena</i> (Treitschke, 1825)	1		4
<i>Apamea platinea</i> (Treitschke, 1825)	1		
<i>Apamea remissa</i> (Hübner, 1809)	1		
<i>Apamea sordens</i> (Hufnagel, 1766)	1		
<i>Caradrina selini</i> Boisduval, 1840			4
<i>Hoplodrina octogenaria</i> (Goeze, 1781)	1		4
<i>Hoplodrina superstes</i> (Ochsenheimer, 1816)	1		
<i>Hoplodrina respersa</i> (Denis & Schiff., 1775)			4
<i>Caradrina gilva</i> (Donzel, 1837)	1		4
<i>Caradrina morpheus</i> (Hufnagel, 1766)			4
<i>Atypha pulmonaris</i> (Esper, 1790)	1		4
<i>Sideridis reticulata</i> (Goeze, 1781)	1		
<i>Polia nebulosa</i> (Hufnagel, 1766)			4
<i>Lasionycta proxima</i> (Hübner, 1809)	1		

<i>Lacanobia contigua</i> (Denis & Schiff., 1775)	1		4
<i>Hecatera bicolorata</i> (Hufnagel, 1766)	1		
<i>Anarta odontites</i> (Boisduval, 1829)	1		
<i>Hadena confusa</i> (Hufnagel, 1766)	1		4
<i>Hadena albimacula</i> (Borkhausen, 1792)	1		
<i>Hadena filograna</i> (Esper, 1788)	1		
<i>Hadena caesia</i> (Denis & Schiff., 1775)	1		4
* <i>Hadena tephroleuca</i> (Boisduval, 1833)	1		
<i>Hada plebeja</i> (Linnaeus, 1761)	1		
<i>Ceramica pisi</i> (Linnaeus, 1758)	1		
<i>Phlogophora scita</i> (Hübner, 1790)	1		4
<i>Euplexia lucipara</i> (Linnaeus, 1758)			4
<i>Athetis pallustris</i> (Hübner, 1808)	1		
<i>Mythimna conigera</i> (Denis & Schiff., 1775)	1		4
<i>Mythimna impura</i> (Hübner, 1808)			4
<i>Mythimna albipuncta</i> (Denis & Schiff., 1775)	1		
<i>Mythimna ferrago</i> (Fabricius, 1787)			4
<i>Leucania comma</i> (Linnaeus, 1761)	1		
<i>Mniotype adusta</i> (Esper, 1790)	1		4
<i>Brachylochia viminalis</i> (Fabricius, 1776)			4
<i>Cucullia umbratica</i> (Linnaeus, 1758)	1		
<i>Calophasia lunula</i> (Hufnagel, 1766)	1		
<i>Cryphia ereptricula</i> (Treitschke, 1825)			4
<i>Cryphia muralis</i> (Forster, 1771)			4

## Discussion

About 400 species of Lepidoptera within one week of the best season, at first glimpse not an extraordinary result as our survey only covers about 15 % of the roughly 2600 Macedonian species. Other researchers have e.g. found about 60 % of the butterflies known in the Republic of Macedonia within one week (Verovnik et al. 2010). However, in contrast to the last mentioned study our research activities concentrated on a small area of the country and furthermore results suffered from bad weather conditions with several thunderstorms, strong wind and low temperatures. Under such circumstances the number of 48 new country records is extraordinary and gives clear evidence to considerable gaps in faunistic research. Though the number of new taxa is largely based on Fauna Europaea and hence few records may have been published in "hidden" literature the lacks of faunistic data in this part of Macedonia are obvious. Several taxa are small and difficult to observe and to identify which may be one of the reasons for long-lasting neglect. However, though the majority of new records belong to various families of "Microlepidoptera", we also found a considerable amount of so-called Macrolepidoptera not yet known (or published) from the country. Among these 12 species some are externally striking such



as *Autographa aemula* and *A. bractea* and should not have been overlooked in other and better surveyed areas. It seems therefore very likely that most of these taxa only have a limited distribution in Macedonia with a restriction to mountain habitats. Of particular interest are the few highly isolated populations of species not yet known from the entire Balkan Peninsula, among them *Mompha sturnipennella*, *Epilobophora sabinata* and *Autographa aemula*.

The faunistic survey doubles not only the number of species known from the National Park (Krpač & Lazarevska, 2008; Krpač, 2010) so far but includes some biogeographically most interesting taxa. Endemic species of the Balkans are e.g. *Infurcitinea albanica*, *Rhigognostis wolfschlaegeri*, *Megacraspedus incertellus*, *Acompsia ponomarenkoae*, *Catoptria acutangulella*, *Catoptria kasyi* and *Charissa certhiatus* but also at least two relict arctic-alpine species were recorded (*Macaria fusca*, *Erebia pandrose*).

A particular striking result of our survey is the discovery of maybe 4 species new to science. Though these results are preliminary, a careful check of genitalia morphology and external appearance makes it very likely that two species of *Dichrorampha* (Tortricidae), one *Plutella* sp. and one *Exaeretia* sp. are still undescribed whereas few species of *Elachista*, *Dahlica*, *Coleophora* and *Eucosma* have not been identified due to lack of concise identification literature.

### Acknowledgments

we thank the authorities of the Ministry of Environment and Physical planning who gave us the permits to visit the Korab area in the Mavrovo National Park and furthermore the staff of the protected area for kind support. For important help we thank the Austrian Embassy in Skopje, especially his Excellency Ambassador Dr Alois Kraut. Moreover, we thank the director of the Macedonian Museum of Natural History in Skopje, Ismet Mehmeti, for his friendly support of our expedition. Mr Bernhard Tarmann (Völs, Austria) is thanked for sponsoring the expedition by the loan of his Landrover Defender that enabled us to carry heavy equipment into the mountains.

### Literature

- Daniel, F.**, 1964: Die Lepidopterenfauna jugoslawisch Mazedoniens. II. Bombyces et Sphinges. Posebno Izdanje. Prirodonaučen Muzej Skopje 2: 1-74.
- Klimesch, J.**, 1968: Die Lepidopterenfauna Mazedoniens. IV. Microlepidoptera. Posebno Izdanje. Prirodonaučen Muzej Skopje 5: 1-203.
- Krpač, V.**, 2010: Final report on the Project "Protection of human surrounding, economic development and promotion of sustainable eco-tourism", Inventory list of invertebrates fauna (Invertebrata) in the National park Mavrovo, 1-85. Skopje.

- Krpac, V., & Lazarevska, 2008:** Check list of butterflies (Lepidoptera: Hesperioidea and Papilionoidea) in Macedonia. Society for Plant Protection of Republic of Macedonia, Skopje 19: 17-24.
- Leone, L. M. & Puccioni, D., 2009:** Invertebrate Fauna Survey, July 2009 in Environmental protection, economic development and promotion of eco/sustainable tourism in the Mavrovo National Park.
- Michieli, S., 1963:** Beitrag zur Kenntnis der Makrolepidopterenfauna Mazedoniens (NR Makedonija). *Acta Musei Maced. Sci. Natur.* IX, 2/78: 15-33.
- Pinker, R., 1968:** Die Lepidopterenfauna Mazedoniens. III. Geometridae. Posebno Izdanie. Prirodonaucen Muzej Skopje 4: 1-72.
- Rebel, H. & Zerny, H., 1931:** Die Lepidopterenfauna Albaniens. *Denkschriften der Akademie der Wissenschaften, Math. Nat. Kl.* 103: 37-161.
- Schaider, P. & Jaksic, P., 1989.** Die Tagfalter von Jugoslawisch Mazedonien Diurna (Rhopalocera und Hesperioidea). Selbstverlag Paul Schaidler, München. 82 pp.
- Turner, J., 1964:** Die Lepidopterenfauna jugoslawisch Mazedoniens. I. Rhopalocera, Grypocera und Noctuidae. Posebno Izdanie. Prirodonaucen Muzej Skopje 1: 1-158.
- Verovnik, R., Micevski, B., Durić, M., Jakšić, P., Keymeulen, A., van Swaay, C. & Veling, K., 2010:** Contribution to the knowledge of the butterfly fauna of the Republic of Macedonia (Lepidoptera: Papilionoidea & Hesperioidea). *Acta entomologica Slovenica* 18: 31-46.

*Received / Prejeto:* 6. 9. 2011