

MACROLEPIDOPTERA SPECIES CHARACTERISTIC FOR THE MONTANE, SUBALPINE AND ALPINE LEVELS OF THE MASSIFS SITUATED IN HUNEDOARA COUNTY (ROMANIA)

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Abstract. The author presents *Macrolepidoptera* species (Ord. *Lepidoptera*) characteristic for the montane, subalpine and alpine levels of the mountains situated on the territory of Hunedoara County (Romania). The study is based on data published by Romanian entomologists and by personal researches effected in Retezat, Șureanu, Parâng (Southern Carpathians), Poiana Ruscă and Metaliferi Mountains (Western Carpathians). Some endemic species and subspecies were recorded from these mountains: *Coenonympha rhodopensis*, *Erebia cassioides neleus*, *Glacies coracina dioszeghyi* and *Apamea maillardi carpatobrunnea*.

Keywords: *Macrolepidoptera*, mountainous, subalpine, alpine, levels, Hunedoara County, Romania.

Rezumat. Specii de *Macrolepidoptere* caracteristice etajelor montan, subalpin și alpin din masive aflate pe teritoriul județului Hunedoara. Autorul prezintă speciile de *Macrolepidoptere* (Ord. *Lepidoptera*) caracteristice etajelor montan, subalpin și alpin din masive montane situate pe teritoriul județului Hunedoara. Studiul este bazat pe datele publicate de entomologi români și pe cercetările personale efectuate în Munții Retezat, Șureanu, Parâng (Carpații Meridionali), Poiana Ruscă și Metaliferi (Carpații Occidentali). Câteva specii și subspecii endemice, au fost identificate în acești munți: *Coenonympha rhodopensis*, *Erebia cassioides neleus*, *Glacies coracina dioszeghyi* și *Apamea maillardi carpatobrunnea*.

Cuvinte cheie: *Macrolepidoptera*, montane, subalpin, alpin, etaje, județul Hunedoara, România.

INTRODUCTION

Hunedoara County is situated in the western part of Romania and in the south-western part of Transylvania. It is crossed by the Mureș River from East to West. In its northern part, there are located the Metaliferi and Zarand Mountains (the Apuseni Mountains). In the southern part of the Mureș River, a large surface is occupied by the Retezat Mountains and a part of the Țarcu-Godeanu, Șureanu and Parâng Mountains (Southern Carpathians). The eastern part of the Poiana Ruscă Mountains (Western Carpathians) is also situated in Hunedoara County. The relief of the county is especially mountainous, but almost all the mountains border large depressions and couloirs as Hațeg, Brad and Petroșani Depressions and the Strei and the Mureș Couloirs. The hydrography of Hunedoara County is represented by the Mureș River, the Crișul Alb River and the Strei River.

The Retezat Mountains (Southern Carpathians) cover a surface of 800 km² and have more than 30 peaks. Among them we mention Retezat (2,484 m alt.), Peleaga (2,509 m) and Păpușa (2,502 m alt.). In the mountainous and subalpine levels, there are spread more than 80 natural glacial lakes. In 1935, the National Park of Retezat Mountains (38,047 ha) was created in order to protect the natural ecosystems, flora and fauna of these mountains.

The Șureanu Mountains (Southern Carpathians) are situated on the territory of Hunedoara and Alba Counties. In the south-eastern part of Hunedoara County, these mountains are characterized by the presence of a large surface of calcareous zones. Here, The Natural Park of Grădiștea Muncelului-Cioclovina was set up in 1979 and later legislated by the Decision of the Romanian Government no. 230/2003. The natural park covers an area of 38,000 ha.

The Parâng Mountains are situated in the southern part of Hunedoara County, being a part of the mountain group Parâng-Șureanu-Lotrului Mountains. The highest peak is Parângu Mare (2,518 m altitude). The total area is about 1,100 km².

The Metaliferi Mountains and Zarand Mountains (Western Carpathians), situated in the northern part of the Mureș River, are characterized by calcareous and volcanic rocks. In the calcareous area, spectacular gorges crossed by the tributaries of the Mureș River are situated. The altitude is between 500 m and 1,000 m.

The Poiana Ruscă Mountains (Western Carpathians) are located on the territory of Hunedoara, Caraș and Timiș Counties. They are considered as a linking bridge between the Apuseni Mountains and the Southern Carpathians. The total area of these mountains is 2,640 km². The altitude oscillates between 700 m and 1,000 m.

Studies about the *Lepidoptera* fauna of the mountainous massifs of Hunedoara County have been published by different authors. DIÓSZEGHY (1929-1930, 1933-1934), KÖNIG (1959, 1969), BURNAZ & KÖNIG, (1984) have published data about the *Lepidoptera* fauna of the Retezat Mountains. 680 species of *Macrolepidoptera* have been recorded from the mountainous, subalpine and alpine levels of the Retezat Mountains (RÁKOSY, 1993a, 1997). Some very rare species as *Abrostola agnorista*, *Conisania poelli*, *Colostigia aqueata*, *C. collararia*, *Yezognophos anderregaria*, *Baptria tibilae*, *Paraxarnis fugax*, *Hydraecia petasitis vindelica* and *Apamea sicula syriaca* were recorded from the Retezat Mountains. 729 species were recorded from the natural habitats of the Șureanu Mountains (BURNAZ, 2008). Some rarities as *Coscinia cribraria pannonica*, *Gortyna borelli lunata*, *Endromis versicolora*, *Tyria jacobaeae*, *Pseudochropleura musiva*, *Xestia castanea*, etc. were recorded in these mountains. 206 species were recorded from the Parâng Mountains (RÁKOSY, 1995). In the limestone and volcanic areas of the Poiana Ruscă Mountains a number of

104 Rhopalocera species was recorded (BURNAZ, 2000). *Lycaena helle* was recorded from two sites of these mountains (the Cerna Valley and the Dobra Valley). 302 species were recorded especially from the limestone areas of the Metaliferi Mountains (BURNAZ, 1992). Data about ecological, biological and zoogeographical aspects the Macrolepidoptera fauna of Hunedoara County have been published by BURNAZ (2002, 2006).

MATERIAL AND METHODS

Personal researches about the Macrolepidoptera species characteristic to the mountainous, subalpine and alpine levels have been conducted between 1985 and 2008.

The specimens have been collected in various sites specific to the mountainous, subalpine and alpine levels of the massifs:

- Ponorici-Cioclovina - a limestone area located in the western part of the Şureanu Mountains (900 m altitude);
- Crivadia Gorges - a limestone area situated in the southern part of the Şureanu Mountains (500-700 m altitude);
- Băniţa Gorges and Bolii Hill (904 m) - a limestone area situated in the southern part of the Şureanu Mountains. It represents a couloir between Haţeg and Petroşani Basins;
- Godeanu Valley - Anineş, close to the fortress of Sarmizegetusa Regia; In this area, the coniferous and mixed forests are predominant;
- The Hill of Grădiştea Muncelului and Sarmizegetusa Regia (1,200 m altitude). Deciduous forests and especially beech forests are present;
- Godeanu Mountain (1,656 m) in the central part of the Şureanu Mountains;
- Mada Gorges - a limestone protected area situated in the southern part of the Metaliferi Mountains; the maximum altitude is in the Pleşa Mare Hill (712 m);
- Crăciuneşti Gorges - a limestone protected area situated in the Metaliferi Mountains;
- Ribicioara and Uibăreşti Gorges - two protected areas situated in the northern part of the Metaliferi Mountains;
- Cerna Gorges - a protected area situated in the eastern part of the Poiana Ruscă Mountains, near Hunedoara town;
- Muncelu Valley and Muncelu Hill (1149 m) situated in the northern part of the Poiana Ruscă Mountains;
- Gura Zlata Chalet - situated at 775 m altitude in the Retezat Mountains. It is one of the principal route to the National Park of the Retezat Mountains;
- Cărnic Chalet - situated at 1005 m altitude, on the Nucşoara Valley (the Retezat Mountains);
- Pietrele Chalet - situated at 1480 m altitude in the Retezat Mountains;
- Gemenele - scientific reserve situated at 1780 m altitude in the National Park of the Retezat Mountains.

Samples were made using the entomological net for the butterflies and a light trap (250 Watt) for the nocturnal species.

Species recorded by Diószeghy Ladislau and Frederic König, especially from the habitats of the Retezat Mountains (Berhina, Radeş, Slăvei and other sites), are also presented. The specimens collected by these entomologists and our lepidopterological material are kept in the entomological collection of Deva Museum.

RESULTS AND DISCUSSIONS

Lepidoptera species have optimal conditions of their life-cycle development in the habitats of Hunedoara County. Based on personal researches and published papers of other Romanian entomologists we may highlight the diversity of the Lepidoptera species characteristic of the mountainous, subalpine and alpine stages of Hunedoara County. Especially, the Retezat, Şureanu, Poiana Ruscă, Parâng and Metaliferi Mountains have been researched. But some mountainous areas as the Vulcan and the Tarcu-Godeanu are less known concerning the Macrolepidoptera fauna.

In Hunedoara County and especially in the area of the mountains, various phytosociological formations are preferred or characteristic habitats for Macrolepidoptera communities.

A large surface of the Retezat, Şureanu, Poiana Ruscă, Parâng and Metaliferi Mountains is occupied by beech forests (*As. Carpino-Fagetum* PAUCĂ, 1941 and *As. Symphyto cordati-Fagetum silvaticae* VIDA, 1959) that are spreading between 500 m-700 m and 1,200 m altitude. Coenoses of *As. Phylitidi-Fagetum* VIDA (1959) 1963 are widespread in Ponorici-Cioclovina limestone area and also in the Gorges of Crivadia, Băniţa and Taia (the Şureanu Mountains). A lot of species such as *Ennomos autumnaria*, *E. fuscantaria*, *E. erosaria*, *Campaea margaritata*, *Cyclophora albipunctata*, *Phalera bucephala*, *Stauropus fagi*, *Amphipyra perflua*, *Pseudoips prasinana*, *Acrionicta aceris*, *A. tridens*, *Polia nebulosa*, *Colocasia coryli*, *Calliteara pudibunda*, *Endromis versicolora*, *Aglia tau*, *Falcaria lacertinaria* have a preference for this type of habitats. These species are related in their larval stage to *Fagus sylvatica*, *Carpinus betulus*, *Betula pendula* and other deciduous trees.

Mixed forests with beech, spruce and fir trees occupy large areas of the upper limit of beech forests, in the Retezat, Parâng, Şureanu and Poiana Ruscă Mountains. This type of forests is spread at 800 m-1,200 m altitude but in some areas the forests climb up to 1,400 m. The coenoses are represented by *Pulmonario rubrae-Abietum-Fagetum*

SOÓ, 1964, *Chrysanthemo rotundifolio-Piceo-Fagetum* SOÓ, 1964, VIDA, 1959 and *Leucanthemo waldsteinii-Piceo-Fagetum* SOÓ, 1964 associations. In these phytosociological formations we meet both species characteristic to deciduous forests and coniferous one. *Odontopera bidentata*, *Plemyria rubiginata*, *Chloroclysta siterata*, *C. truncata*, *Trichopteryx carpinata*, *Endromis versicolora*, *Nododonta dromedarius*, *Amphipyra pyramidea*, *Polia trichoma* and *Arctornis l-nigrum* were identified in mixed forests.

The coniferous forests have the greatest extension in the Retezat Mountains (1,200 m-1,850 m altitude), but they are also widespread in the Șureanu Mountains (in the area of the Godeanu Valley) and the Parâng Mountains. Spruce fir forests are represented by As. *Hieracio rotundati-Piceetum* BR.-BL. et TX. 1939 (alt. 1500-1600 m) and (As. *Bruckenthalio-Piceetum* BORHIDI 1969 (alt. 1750 m-1850 m); Some mono and oligophagous species as *Macaria signaria*, *M. liturata*, *Peribatodes secundaria*, *Deileptenia ribeata*, *Hylaea fasciaria fasciaria*, *Puengelera capreolaria*, *Thera variata*, *T. obeliscata*, *Panolis flammea*, *Panthea coenobita*, *Hyloicus pinastris*, *Alcis jubata jubata*, *Dendrolimus pini montana* and *Cosmotriche lunigera* are typical for these ecosystems.

Meadows are spread in all the mountainous area of the Retezat, Parâng, Șureanu, Poiana Ruscă and Metaliferi Mountains. Coenoses of *Scorzonero roseae-Festucetum nigricantis* (PUȘCARIU et al. 1956) COLDEA, 1987 and *Violo declinatae-Nardetum* SIMON, 1966 associations are spread at 1000 m-1200 m altitude in the Retezat, Parâng and Șureanu Mountains. In the area of beech and spruce fir forests, instead the cut forests, *Fectuco rubrae-Agrostietum capillaris* HORV., 1951, *Poo-Trisetetum flavescens* KNAPP, 1951 and *Anthoxantho-Agrostietum capillaris* SILLINGER 1933 associations are spread. Characteristic of mesophyllous meadows are *Scopula immorata*, *Idaea biselata*, *I. emarginata*, *Scotopteryx chenopodiata*, *Xanthorhoe fluctuata*, *Perizoma minoratum minoratum*, *Minoa murinata*, *Hemaris fuciformis fuciformis*, *Parasemia plantaginis carpathica*, *Diachrysia chryson chryson*, *Paradrina clavipalpis*, *Photedes captiuncula*, *Hada nana nana*, *Cerapteryx grammis grammis*, *Neuronina decimalis*, *Lasionycta proxima*, *Noctua pronuba*, *Autographa gamma*, *Diachrysia chrysitis*, *Agrotis segetum*, *A. exclamationis* and *A. ipsilon*.

Flowery plants of these meadows are nectar source for various species of butterflies as *Erynnis tages tages*, *Colias croceus*, *C. hyale*, *Pieris napi napi*, *P. rapae*, *Boloria dia dia*, *Boloria e.*, *B. selene*, *Melanargia galathea*, *Erebia aethiops aethiops*, *Coenonympha arcania*, *C. glycerion glycerion*, *Argynnis adippe*, *A. niobe niobe*, *Issoria lathonia*, *Erebia euryale syrmyia* and *Polyommatus icarus*.

Subalpine and alpine meadows (As. *Violo declinatae-Nardetum strictae* SIMON, 1966, As. *Potentillo chrysocraspedae-Festucetum airoidis* BOȘCAIU, 1971 and As. *Primulo-Caricetum curvulae* BR.-BL. 26 em. OBERD., 59) are spread in the Retezat, Parâng and Șureanu Mountains. Some species of Macrolepidoptera as *Apamea lateritia*, *A. maillardi carpatobrunnea*, *A. rubrireana*, *Erebia euryale syrmyia*, *E. gorge fredericikoenigi*, *E. pandrose roberti* and *E. epiphron transsylvanica* are characteristic for subalpine meadows. They are related to various Poaceae as trophic source for their larvae. Some of these species as *Erebia pandrose roberti* and *E. gorge fredericikoenigi* have been also identified in alpine meadows. Other species as *Scotopteryx chenopodiata*, *Hada nana*, *Leucania comma*, *Noctua fimbriata*, *Xestia speciosa*, *Papestra biren*, *Gnophos obfuscatus* were also identified in the subalpine meadows.

Subalpine shrubs (As. *Rhododendro myrtifolii-Pinetum mugii* BORZA, 1959 em COLDEA, 1985, As. *Vaccinio-Pinetum mugii* HADAC, 1956, JENIK, 1961 and As. *Rhododendro myrtifolii-Vaccinietum* BORZA, (1955, 1959) are spreading in the subalpine level of the Retezat, Parâng and Șureanu Mountains at 1650 m-1950 m altitude.

Species of Macrolepidoptera have been identified in the habitats of subalpine shrubs of the Retezat and Șureanu Mountains. The community of Macrolepidoptera is represented by species characteristic for subalpine level as *Apamea maillardi carpatobrunnea*, *Thera variata*, *Scopula ternata*, *Xestia speciosa*, *Lasiocampa quercus f. alpina*, *Xanthorhoe montanata*, *Hydriomena impluviata*, *Rheumaptera hastata*, *Eupithecia tenuiata*, *Aplocera plagiata*, *Cleorodes lichenarius*, *Peribatodes secundaria*, *Puengelera capreolaria*, *Elophos vittarius mendicarius*, *Parasemia plantaginis carpathica*, *Polia trichoma*, *Diarsia mendica mendica*, *D. brunnea brunnea*, *Eurois occultus*, *Hypena proboscidalis*, *Anaplectoides prasina*, *Erebia euryale syrmyia*, *E. epiphron transsylvanica*, *E. pandrose roberti* are very common in June-July. The adults of these species visit especially the flowers of *Vaccinium myrtillus* and *Rhododendron myrtifolium*.

Macrolepidoptera communities specific to the habitats of mountainous rocks were studied especially in the limestone area of the Șureanu Mountains. Here, the vegetation is represented by *Asplenio-Cystopteridetum fragillis* OBERD. (1939, 1949), *Melico-Phleetum montani* BOȘCAIU et al., 1966 and *Asperulo capitatae-Seslerietum rigidae* (ZOLY 1939) COLDEA 1991 (at the Ponorici-Cioclovina Karst Complex, Crivadia Gorges, Taia Gorges and Bănița Gorges). The diversity of the mono and dicotyledonata herbaceous plants and shrubs as well as the favourable local climate offer optimal conditions for a rich and various Lepidoptera species. In these ecosystems we have identified 335 Macrolepidoptera species. Most of them are spread only in limestone habitats as *Polymixis rufocincta*, *Xestia ashworthii candelarum*, *Sideridis lampra*, *Triphosa sabaudiata*, *Orthostixis cribraria*, *Coscinia cribraria pannonica Scopula incanata*, *Ochropleura musiva musiva*, *Chersotis multangula*, *Xestia castanea*, *Hadena perplexa perplexa*, *Episema glaucina glaucina*, *H. compta*, *H. albimacula*, *H. perplexa perplexa*, *Pachetra sagittigera*. Some of these species as *Coscinia cribraria pannonica*, *Xestia ashworthii candelarum*, *Polymixis rufocincta* have also been identified by RÁKOSY (1993) in the calcareous area of the Retezat Mountains. Flowers of Dicotyledonata species are visited by *Zerynthia polyxena*, *Polyommatus coridon coridon*, *P. daphnis*, *Scoliantides orion lariana* and *P. bellargus*. But the mountainous rocks situated in the crystalline area of the Șureanu Mountains also offer optimal conditions for Macrolepidoptera species. In the habitats situated on the southern slopes of the mountains *Thetidia smaragdaria*,

Scopula nigropunctata, *S. marginepunctata*, *S. rubiginata*, *Chlorissa cloraria*, *Thalera fimbrialis*, *Idaea ochrata*, *I. trigeminata*, *I. straminata*, *Scotopteryx moeniata*, *Entephria flavicinctata flavicinctata*, *Anticlea badiata*, *Nebula salicata salicata*, *N. tophaceata*, *N. nebulata*, *Euphyia scripturata*, *Perconia strigillaria*, *Hyles lineata livornica*, *Eilema lurideolum*, *Spiris striata*, *Arctia villica*, *Phragmatobia caesarea*, *Dysauxes ancilla*, *Cryphia fraudatricula*, *C. muralis*, *Calymma communimacula*, *Euchalcia modestoides*, *Cucullia asteris*, *Shargacucullia lychnitis*, *Calophasia lunula*, *Hoplodrina superstes*, *Apamea lithoxilea*, *A. anceps*, *Calamia tridens tridens*, *Hecatera bicolorata*, *Hadena luteago* and *Heliophobus reticulata reticulata* have been identified.

In the Metaliferi Mountains and especially in the Gorges of Mada, Crăciunești, Ribicioara and Uibărești, *Zerynthia polyxena*, *Euphydryas maturna partiensis*, *E. aurinia aurinia*, *Polyommatus coridon coridon*, *P. daphnis*, *Scoliantides orion lariana* and *P. bellargus* are widespread.

Characteristic of subalpine and alpine rocks of the Șureanu, Retezat and Parâng Mountains are *Psodos canaliculata schwingenschussi*, *Gnophos obfuscatus obfuscatus*, *Erebia pandrose roberti*, *E. gorge fredericikoenigi* and *E. epiphron transsylvanica*. In the Retezat Mountains, endemic taxa are spread: *Glacies coracina dioszeghyi* and *E. cassioides neleus*.

Subalpine hygrophilous meadows (As. *Sphagnetum magellanicum* MALCUIT, 1928) are isolated in the Retezat and Șureanu Mountains. Characteristic of these meadows are *Hyppa rectilinea*, *Leucania comma*, *Papestra biren*, *Mnyotipe adusta* and *Syngrapha interrogationis interrogationis*.

In the valleys of the mountain rivers, coenoses of alder trees and various Salicaceae are widespread. As. *Alnetum viridis* (RUBEL) BR.-BL., 1918 and As. *Acereto-Ulmetum* BEGER, 1922 were identified on the Godeanu Valley, between Anineș and Grădiștea de Munte localities (Șureanu Mountains). Here, *Tethea ocellaris*, *T. or or*, *Gastropacha populifolia*, *Poecilocampa populi*, *Laothoe populi*, *Stegania dilectaria*, *Pheosia tremula*, *Cerura vinula*, *C. erminea*, *Furcula furcula forcifcula*, *Clostera anastomosis*, *Acrionicta megacephala*, *Scoliopteryx libatrix*, *Xanthia icterita*, *X. ocellaris*, *Agrochola lota*, *Leucoma salicis* find optimal conditions for their life-cycle.

The checklist presents some taxa recorded from the mountainous, alpine and subalpine levels of the mountain massifs of Hunedoara County. The specimens are kept in the collection of Deva Museum.

LASIOCAMPIDAE

Cosmotriche lunigera (ESPER, 1784): 2♂♂ Grădiștea Muncelului-the Godeanu Valley (the Șureanu Mts.), July 25, 1995, leg. Burnaz (Fig. 1). This species is characteristic for coniferous forests and it is rare in the Șureanu Mountains. It was also recorded in the Retezat and Parang Mountains (RÁKOSY, 1993, 1995, 1997). The adults fly in June-August. The larvae feed on *Pinus*, *Picea* and *Abies*. In Central Europe it has become rare during recent decades.

ENDROMIDAE

Endromis versicolora versicolora (LINNAEUS, 1758): 2♂♂ Grădiștea Muncelului (the Șureanu Mts.), May 15, 1994, leg. Burnaz (Fig. 2). It is a rare species characteristic of deciduous forests. Adults fly in April-May. Female are nocturnal but males can be observed during the day. The larvae feed on *Betula*, *Alnus*, *Tilia*, *Fagus*, *Corylus*.

SPHINGIDAE

Hyloicus pinastri (Linnaeus, 1758): 3♂♂ Ponorici-Cioclovina Karst Complex (the Șureanu Mts.), July 14, 1999, leg. Burnaz. The adults fly in a single generation in May-July and prefer the edge of the coniferous forests. The larvae feed on *Pinus* sp.

PAPILIONIDAE

Parnassius mnemosyne transsylvanica SCHMIDT, 1930: 5♂♂, 2♀♀, the Godeanu Valley (the Șureanu Mts.) June 8, 1989; 3♂♂, Mada Gorges May 29, 1990; 2♂♂, Crivadia Gorges (the Șureanu Mts.), June 27, 1997; 4♂♂ 1♀, Muncelu Hill (Poiana Ruscă Mts.), June 24, 2007; 3♂♂, 1♀ Crăciunești Gorges June 14, 2008, leg. Burnaz (Fig. 3). It is a Carpathian endemite, common in the the Retezat, Parâng, Metaliferi, Șureanu and Poiana Ruscă Mountains. Adults fly in May-August and prefer wet meadows, the edge of the deciduous and coniferous forests and subalpine grasslands. The larvae feed on Papaveraceae (*Corydalis* sp.).

NYMPHALIDAE

Erebia epiphron transsylvanica REBEL, 1908: 3♂♂ Retezat Mts., August 3, 1927, leg. Diószeghy; Gura Zlata (Retezat Mts.), July 29, 1978, July 27, 1979, leg. König; 3♂♂ Gemenele Scientific Reserve (the Retezat Mts.), August 24, 1985; 5♂♂ Cărnic (the Retezat Mts.), July 24, 1995, leg. Burnaz. This subspecies is a Carpathian endemite. It is very common in the Retezat Mountains, Parâng and Șureanu Mountains. The adults fly in July and August in montane and subalpine meadows. The larvae feed on Poaceae.

Erebia medusa psodea (HÜBNER, 1804). 3♂♂ Bănița Gorges (Șureanu Mts.) July 17, 1986; 5♂♂ Taia Gorges (the Șureanu Mts.) July 19, 1989; 6♂♂, 2♀♀ Muncelu Hill (the Poiana Ruscă Mts.), July 17, 2008, leg. Burnaz. This species is very common at a low altitude (600-1,000 m) in all the mountainous area of Hunedoara County. The adults fly in July-August in damp meadows but they also prefer the edge of the deciduous forests. The larvae feed on Poaceae.

Erebia gorge fredericikoenigi VARGA, 1999 – 3♂♂ Gemenele (the Retezat Mts.), July 22, 1991, leg. Burnaz. It is an endemic subspecies found only at the highest altitude of the Retezat, Parâng and Șureanu Mountains, in subalpine and alpine rocks with mesophilous vegetation. Adults fly in July. The larvae feed on various Poaceae. In the Red List of the butterflies of Romania it is listed as a vulnerable taxon (RÁKOSY, 2003).

Erebia pandrose roberti PESCHKE, 1929: 2♂♂ the Retezat Mts., July 13, 1921, leg. Diószeghy; 2♂♂ Slăvei (Retezat Mts.), July 21, 1972, August 3, 1980, leg. König; 3♂♂, 1♀ Gemenele (the Retezat Mts.), July 25, 1991, leg. Burnaz; 1♂, 1♀ Retezat Peak, July 24, 1991, 1,900 m, leg. Șuster, det. Burnaz. It is a boreo-alpine subspecies common in Southern and Western Carpathians. Adults fly in July and the first decade of August in subalpine and pastures, up to 2,000 m. The larvae feed on Poaceae.

Erebia cassioides neleus FREYER, 1844: 2♂♂ Radeș (the Retezat Mts.), July 18, 1979, leg. König; 3♂♂, 1♀, the Retezat Mts., Gemenele, August 20, 1985; 3♂♂ Godeanu Mt. (the Șureanu Mts.), July 18, 1994, leg. Burnaz. It is an endemic species localized in the western part of the Southern Carpathians, especially in the Retezat and Țarcu-Godeanu Mountains. The adults fly in July-August in subalpine meadows and shrubs. The larvae feed on Poaceae (*Festuca* sp.).

Erebia sudetica radnaensis (REBEL, 1915): 4♂♂ Retezat Mts., July 30, 1927, leg. Diószeghy; 5♂♂ Berhina (Retezat Mts.), July 28, 1978, leg. König; 3♂♂ Pietrele (Retezat Mts.), July 18, 1995, leg. Burnaz. It prefers montane and subalpine meadows. The adults fly in July-August. The larvae feed on Poaceae. This subspecies is a Carpathian endemite, spread in the Southern and Eastern Carpathians (SZÉKELY, 2008).

Coenonympha rhodopensis rhodopensis ELWES, 1900: 2♂♂, 1♀ Radeș (the Retezat Mts.), July 19, 1979, leg. König. The adults fly in June-August in mesophilous grassy meadows, at 1,400 m altitude and up to 2,000 m. The larvae feed on Poaceae. This species has a restricted area, recorded from our country only of the Retezat Mountains. It was also recorded from the central part of Italy, ex. Yugoslavia and Bulgaria (RÁKOSY, 1993 b, SZÉKELY, 2008).

GEOMETRIDAE

Bupalus piniaria (LINNAEUS, 1758): 2♂♂ Godeanu Valley (the Șureanu Mts.). It is a rare species characteristic for coniferous forests. In this area of the Șureanu Mountains it is a relative rare species. The adults fly in June. The larvae feed on *Pinus* sp.

Cleorodes lichenaria (HUFNAGEL, 1767): 1♂ Ponorici-Cioclovina (the Șureanu Mts.). This species is rare in the Șureanu Mountains. The adults fly at the edge of the forests but also prefer rocks habitats. The fly period is June-August. Larvae are lichenophagous.

Deileptenia ribeata (CLERCK, 1759): 4♂♂, 1♀ the Godeanu Valley (the Șureanu Mts.), August 3, 1998, leg. Burnaz. This is a very common species that inhabits deciduous and coniferous forests. The adults fly in June-August. The larvae feed on *Picea* and *Abies*.

Peribatodes secundaria (DENIS & SCHIFFERMÜLLER, 1775): 3♂♂ the Godeanu Mt. (the Șureanu Mts.), July 14, 1999. It inhabits in the area of coniferous forests. The food plants of larvae include *Picea* and *Abies*.

Hylaea fasciaria fasciaria (LINNAEUS, 1758): 6♂♂, 1♀ the Godeanu Valley-Aniș (the Șureanu Mts.) August 18, 1984; 8♂♂ Gura Zlata (the Retezat Mts.) July 29, 1985; Cârnic (the Retezat Mts.) August 22, 1995, leg. Burnaz. It is a mountain species, very common in the level of the coniferous forests. The adults fly in June-August. The larvae feed on Pinaceae.

Puengeleria capreolaria (DENIS & SCHIFFERMÜLLER, 1775): 4♂♂ the Godeanu Valley-Aniș (the Șureanu Mts.), July 18, 1994; 1♂ Grădiștea Muncelului (the Șureanu Mts.), July 24, 1998, leg. Burnaz. It is a common species in the level of the coniferous species and mixed forests. The adults fly in June-August. The larvae feed on Pinaceae.

Gnophos obfuscata obfuscata (DENIS & SCHIFFERMÜLLER, 1775): 1♂ Gemenele (the Retezat Mts.), August 19, 1985; 1♂ Pietrele (Retezat Mts.), August 20, 1995, leg. Burnaz. This taxon is characteristic for montane and subalpine rocks. The adults fly in July-August. The larvae feed on various herbaceous plants.

Glacies coracina dioszeghyi (SCHMIDT 1930). 1♂ the Retezat Mts., Slăvei, August 3, 1980, leg. König. This is an endemic taxon widespread in Retezat Mountains. The adults fly in June-July in the area of subalpine rocks. The larvae feed on *Empetrum nigrum*.

Glacies canaliculata schwingenschussi WEHRLI, 1919: 2♂♂ Godeanu Mt. (the Șureanu Mts.), 1,650 m, July 28, 1999, leg. Burnaz. It is an endemic subspecies of Carpathians and a boreo-alpine element. The adults fly in June-July especially in the area of subalpine rocky habitats. The larvae feed on *Pedicularis* sp.

Elophos vittarius mendicarius (HERRICH-SCHÄFFER, 1852): 2♂♂ the Șureanu Mts. (Godeanu Mt.) July 20, 1995, leg. Burnaz. The adults fly in July and prefer subalpine rocks. The larvae are polyphagous and feed on various herbaceous plants and Ericaceae.

Scopula ternata (SCHRANK, 1802): 3♂♂ Godeanu Mt. (the Șureanu Mts.), July 19, 1995, leg. Burnaz. It is characteristic for the subalpine level. The adults fly in July-August and prefer shrubs area and mesohygrophilous meadows. The larvae feed on Ericaceae.

Colostygia olivata (DENIS & SCHIFFERMÜLLER, 1775): 1♂ the Godeanu Mt. (the Şureanu Mts.), July 19, 1995, leg. Burnaz. This species is characteristic for montane and subalpine meadows. The larvae feed on various herbaceous plants.

Thera stragulata (HÜBNER, 1809): 1♂ the Godeanu Valley (the Şureanu Mts.), July 19, 1995. It is a rare species in the area of the Şureanu Mountains. It occurs in the level of the coniferous forests. Larvae feed on Pinaceae.

NOCTUIDAE

Hypena obesalis (TREITSCHKE, 1829): 3♂♂ Cârnic (the Retezat Mts.), August 22, 1995, leg. Burnaz. It occurs in the montane and subalpine levels. The adults fly in July-August in mesophilous meadows. The larvae feed on various herbaceous plants as *Urtica* and *Lamium* sp.

Autographa iota (LINNAEUS, 1758): 2♂♂ Grădiştea Muncelului (the Şureanu Mts.), July 22, 1999, leg. Burnaz. This is a rare species in the area of montane and subalpine levels of the Şureanu Mountains. The adults fly in June-July. The larvae feed on *Urtica* and other herbaceous plants.

Syngrapha interrogationis interrogationis (LINNAEUS, 1758). It is a very common taxon that occurs in all the Carpathian Mountains, in the area of montane and subalpine meadows. The adults fly in June-August. The larvae feed on Ericaceae.

Apamea maillardi carpatobrunnea RÁKOSY, 1996 – This subspecies has been described by RÁKOSY (1996) on the basis of the specimens collected in the Parâng, Retezat and Făgăraş Mountains; 1♂ Retezat Mts., Berhina, July 26, 1975, 2♂♂ Retezat, Gura Apei July 28, 1979, July 27, 1979, leg. König; 4♂♂, 2♀♀ the Şureanu Mts. (Godeanu Mt.) July 27, 1997, leg. Burnaz (Fig. 4). It is a montane-subalpine subspecies. The adults fly in June-September and prefer mesophilous subalpine pastures. The larvae feed on *Poa alpina*, *Nardus stricta* and *Molinia caerulea* (RÁKOSY 1996).

Apamea lateritia (HUFNAGEL, 1766): 2♂♂ Godeanu Mt. (the Şureanu Mts.), July 25, 1996, leg. Burnaz. It is a xeromontane species. The adults fly in montane-subalpine grassy meadows, in June-August. The larvae feed on Poaceae (RÁKOSY 1996).

Pseudochropleura musiva (HÜBNER, 1803): 2♂♂ Ponorici-Cioclovina (the Şureanu Mts.) July 22, 1998, leg. Burnaz. It is a xeromontane species. The adults fly in July-August in limestone rocks and grasslands. The larvae feed on various herbaceous plants.

Pseudochropleura flammata flammata (DENIS & SCHIFFERMÜLLER, 1775): 4♂♂, 1♀, Ponorici-Cioclovina (the Şureanu Mts.), July 25, 2000, leg. Burnaz. It is a xerothermophilous species that prefers open grasslands and the edge of the forests. The adults fly in July-August. The larvae feed on various herbaceous plants.

Eurois occulta (LINNAEUS, 1758): 3♂♂ Cârnic (the Retezat Mts.), August 22, 1995, leg. Burnaz; 2♂♂ the Godeanu Mt. (the Şureanu Mts.), July 28, 1999, leg. Burnaz. This species is characteristic for montane and subalpine shrub associations. The adults fly in July-August. The larvae feed on Ericaceae.

Xestia speciosa (HÜBNER, 1813): 3♂♂ Berhina (the Retezat Mts.), July 21, 1978, July 27, 1978, July 28, 1978, 1♀ July 28, 1978, leg. König; 5♂♂, 1♀ the Şureanu Mts. (Godeanu Mt.), July 24, 1995, leg. Burnaz. It is a boreo-montane species very common in the montane-subalpine level. The adults fly in July-August. The larvae feed on various herbaceous plants and shrubs as *Vaccinium*, *Lonicera*, etc. (RÁKOSY 1996).

Xestia ashworthii candelarum (STAUDINGER, 1871): 2♂♂ Mada Gorges (Metaliferi Mts.), July 19, 1992; 2♂♂ Ponorici-Cioclovina Karst Complex (the Şureanu Mts.), at 900 m altitude, July 24, 1998, leg. Burnaz. This species is characteristic for limestone grasslands. The adults fly in June-August. The larvae feed on various herbaceous plants. It extends throughout Europe from Scandinavia to Turkey and the Caucasus, Russia, but is very localised.

Xestia castanea (ESPER, 1798): 2♂♂ Ponorici-Cioclovina (the Şureanu Mts.), July 22, 1994, leg. Burnaz. It is a xerothermophilous species characteristic for the habitats of rocks with xerophile vegetation. The adults fly in June-August. Larvae feed on various herbaceous plants.

Xestia collina (BOISDUVAL, 1840): 1♂, 2♀♀ the Godeanu Mt. (the Şureanu Mts.), July 25, 1996. This species is found in montane and subalpine mesohygrophilous meadows. The adults fly in June-August. The larvae feed on various herbaceous plants and Ericaceae.

PANTHEIDAE

Panthea coenobita (ESPER, 1785). 4♂♂, 1♀ the Godeanu Valley (the Şureanu Mts.), July 23, 1995, leg. Burnaz. This very common species is characteristic for the habitats of coniferous forests. The adults fly in June-July. The larvae feed on Pinaceae.

ARCTIIDAE

Parasemia plantaginis carpathica (DANIEL, 1939): 6♂♂ the Godeanu Valley, July 17, 1994; 5♂♂ Grădiştea Muncelului June 25, 1995, leg. Burnaz. This is a Carpathian endemite. The male adults are diurnal and they are not attracted to light. They prefer the edge of the forests, montane and subalpine meadows. The flight period is June-July.

The larvae feed on various herbaceous plants and shrubs as *Vaccinium myrtillus*, *V. uliginosum*, *Polygonum* spp., *Rumex* spp., *Plantago* ssp.

CONCLUSIONS

The research conducted in the habitats of montane, subalpine and alpine levels of the Carpathian Mountains situated on the territory of Hunedoara County emphasizes the diversity of the Macrolepidoptera fauna. But some mountainous areas as the Vulcan and Țarcu-Godeanu Mountains are less known concerning the Macrolepidoptera fauna. Therefore, future research must be conducted in these mountains.

Apamea maillardi carpatobrunnea, *Erebia cassioides neleus*, *E. gorge fredericikoenigi*, *Parnassius mnemosyne transsylvanica*, *Glacies coracina dioszeghyi* and other Carpathian endemites must be protected together with their characteristic habitats. Some of them as *Erebia pandrose roberti*, *E. cassioides neleus*, *E. gorge fredericikoenigi* are listed as vulnerable in the Red List of the butterflies of Romania. On the basis of our personal researches, especially in the Șureanu Mountains, there were recorded rare species as *Cosmotriche lunigera*, *Endromis versicolora versicolora*, *Thera stragulata*, *Xestia castanea*, *Pseudochroleura musiva*.

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Figure 1. *Cosmotriche lunigera* (ESPER, 1784)-♂
Figura 1. *Cosmotriche lunigera* (ESPER, 1784)-♂



Figure 2. *Endromis versicolora versicolora* (LINNAEUS, 1758)-1♀
Figura 2. *Endromis versicolora versicolora* (LINNAEUS, 1758)-1♀



Figure 3. *Parnassius mnemosyne transsylvanica* SCHMIDT, 1930-♂
Figura 3. *Parnassius mnemosyne transsylvanica* SCHMIDT, 1930-♂



Figure 4. *Apamea maillardi carpatobrunnea* RÁKOSY, 1996-♂
Figura 4. *Apamea maillardi carpatobrunnea* RÁKOSY, 1996-♂