

# Contributions to the knowledge of diurnal Lepidoptera fauna of the North-Eastern part of Țarcu Mountains (Southern Carpathians, Romania)

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## Rezumat

**Contributii la cunoasterea faunei de lepidoptere diurne din partea nord-estică a Munților Țarcu (Carpații Meridionali, România)**

86 specii de fluturi diurni (Ord. Lepidoptera, Sord. Rhopalocera) au fost semnalate în 2009-2010, în partea nord-estică a Munților Țarcu, situată între Depresiunea Hațegului și Culoarul Bistra-Timiș. Fluturii au fost colectați în habitate situate în zona colinară și montană a văilor Zeicani, Bistra și Bucovița. Este prezentată lista sistematică a speciilor însoțită de date privind perioada de zbor, siturile de colectare și habitatele preferate de adulți. Sunt prezentate de asemenea date referitoare la sursa trofică a adulților, respectiv plantele cu flori vizitate de adulți. Câteva specii protejate de lege în România sau rare în zona cercetată ca *Euphydryas maturna partiensis*, *Euphydryas aurinia aurinia*, *Parnassius mnemosyne distincta*, *Lycaena dispar rutila*, *Neptis hylas*. *Thecla betulae*, *Brenthis daphne* și *Brenthis hecate* sunt considerate specii vulnerabile în Lista Roșie pentru fluturii diurni din România. Pentru aceste specii sunt prezentate date biologice și ecologice.

**Cuvinte cheie** : lepidoptere diurne, Munții Țarcu, Carpații Meridionali

## Abstract

Contributions to the knowledge of diurnal Lepidoptera fauna of the north-east of Țarcu-Mountains (Southern Carpathians, Romania)

86 species of Butterflies (Ord. Lepidoptera, Sord. Rhopalocera) were recorded in 2009-2010 from the north-east of the Țarcu Mountains, situated at the contact between Hațeg Depression and Bistra-Timiș Couloir. Butterflies have been collected in the hilly and mountainous zone of Zeicani Valley, Bistra Valley and Bucovița Valley. A checklist of the species, accompanied by data about the flying period, sites and the preferred habitats of the adults is presented. Data about the adult resources (flowers visited by adults) are also presented. Some species, protected by law in Romania or rare in this zone as *Euphydryas maturna partiensis*, *Euphydryas aurinia aurinia*, *Parnassius mnemosyne transsylvanica*, *Lycaena dispar rutila*, *Neptis hylas*, *Thecla betulae*, *Brenthis daphne* and *Brenthis hecate* are considered vulnerable species according to the Red List of Butterflies of Romania. For these species some biological and ecological data are given.

**Key words**: Diurnal Lepidoptera, Țarcu Mountains, Southern Carpathians

## Introduction

During April-October 2009 and March-June 2010, butterflies (ord. Macrolepidoptera, Sord. Rhopalocera) of the north-eastern part of Țarcu Mountains (Southern Carpathians) have been researched. This zone is located at the contact between Hațeg Depression and Bistra-Timiș Couloir. The researches was conducted on the main valleys that cross the north eastern part of the mountains: Zeicani Valley, Bistra Valley and Bucovița Valley. From the administrative point of view this area is situated within villages Zeicani (Sarmizegetusa locality, Hunedoara County), Băuțar and Bucova localities (Caraș-Severin County). The last localities are separated from Zeicani locality by a zone known as The Iron Gate of Transsylvania.

In the area of Bucova and Băuțar localities, Bistra Valley is bordered by hills and mountains with moderate and low altitude (600-750 m), but in the mountainous zone of Țarcu Massif, the high altitude is of 1507 m.

In the hilly region the vegetation is represented by deciduous forests (As. *Carpino-Fagetum* PAUCĂ 1941) and mixed forests interrupted by meadows and pastures, crops and orchards. At the edge of the forests various shrubs have been identified as: *Crataegus monogyna*, *Prunus spinosa*, *Clematis vitalba*, *Hedera helix*, *Viburnum lantana*, *Sambucus racemosa* and *Sambucus nigra*. Bistra Valley is bordered by alder tree communities and tall-herb fringe communities. In the mountainous zone mixed forests are dominant.

Some rare species were identified in this area as *Anacamptis pyramidalis*, *Orchis pallens*, *Cardamine glanduligera*, *Helleborus purpurascens*, *Galanthus nivalis*, *Campanula patula* ssp. *abientina*, *Sarothamnus scoparius*, *Leontodon crispus*, *Ornithogalum pyramidale*, *Oenanthe banatica* and *Melampyrum bihariense*.

This area has a mild climate with annual average temperature of 8°C and an average of preccipitations of 800 mm.

The aim of this study is to emphasize the butterflies species characteristic of the hilly and mountainous zone of Țarcu Mountains.

## Material and Methods

Rhopalocera species were studied between May-October 2009 and March-June 2010. Four sites comprising the hilly and mountainous areas of Țarcu Mountains were investigated: Zeicani, Bucova, Băuțar and Cornișor villages. We have made several trips to study the butterflies of the following habitats:

1. Mesophilous meadows (Ass. *Agrosteto-Festuceto valesiaca* ARDELEAN 1983; Ass. *Agrosti stoloniferae-Deschampsietum cespitosae* UJVÁROSI 1941; Ass. *Festuco rubrae-Agrostietum capillaris* HORV. 1951, Ass. *Festucetum pratensis* SOÓ 1938, *Anthoxantho-Agrostietum capillaris* SILLING, 1933 and *Arrhenateretum elatioris* BR.-BL. ex SCHERR, 1925) are situated in the hilly region and in the mountainous level of Bistra Valley, Bucovița and Zeicani Valley, at 600 m-800 m and 900 m-1000 m.

2. Meadows of *Junco-Molinietum* PREISING 1951 association – located near Zeicani Valley and Sarmizegetusa locality. In this type of mesohygrophilous meadow some species have been identified as *Juncus conglomeratus*, *Molinia caerulea*, *Centaurea calicitrpa*, *Veratrum album*, *Festuca rubra*, *Prunella vulgaris*. In July-August, *Thalictrum simplex* ssp. *galoides*, *Filipendula ulmaria* and *Gladiolus imbricatus* give the colour of these beautiful meadows (As. *Lysimachio vulgaris-Filipenduletum ulmariae* Balatova-Tulackova 1978). In some place, *Cirsium rivulare* is also very abundant (Ass. *Cirsietum rivularis* Nowinski 1926).

3. The edge of the deciduous forests and mixed forests (Ass. *Carpino-Fagetum* Pauca 1941; Ass. *Pulmonario rubrae-Fagetum* (SOÓ 1964) TÄUBER 1987) (in the mountainous area of Bistra and Bucovița Valley). In this area various shrubs were identified. In May, *Sarothamnus scoparius* is very abundant between Bucova and Băuțar but also in the hilly area of Bistra Valley. *Prunus spinosa*, *Crataegus monogyna*, *Sambucus racemosa*, *Sambucus ebulus*, *Coryllum avellana*, *Sorbus torminalis*, *Viburnum lantana* have been identified in all the studied sites. The most important associations are As. *Prunus spinosae-Crataegetum* (SOÓ 1927) HUECK. 1931; As. *Sambucetum racemosae* OBERD. 1973; As. *Sambucetum ebuli* (KAISER 1926) FELFÖLDY 1942; As. *Coryletum avellanae* SOÓ 1927.

4. Alder and Salix communities (*Stellario nemori-Alnetum glutinosae* (KÄSTNER 1938) LOHM 1957, *Alnetum incanae* (BROCKMAN 1907) AICHINGER ET SIEGRIST 1930, *Salicetum albae* ISSLER 1924) and *Alno-Salicetum cinereae* (POP & all. 2002). The composition of these associations is heterogenous and represented by *Alnus glutinosa*, *Alnus incana*, *Fraxinus excelsior*, *Frangula alnus*, *Salvia glutinosa*, *Epilobium montanum*, *Stellaria nemorum*, *Stachys sylvatica*, *Mentha longifolia*, *Prunella vulgaris*, *Potentilla reptans*, *Glechoma hirsuta*, *Geranium robertianum*, *Scrophularia nodosa*, *Pulmonaria officinalis*, *Euphorbia amygdaloides*.

5. Florosu Valley (an affluent of Bistra Valley) near Cornișor locality; this zone is situated at the contact with Poiana Ruscă Mountains. Here, mesohygrophilous tall-herb fringe communities with *Epilobium montanum*, *Salvia glutinosa*, *Eupatorium cannabinum*, *Mentha longifolia*, *Mentha aquatica* and *Telekia speciosa* were identified.

6. Rocks with mesophylous and meso-hygrophilous vegetation (*Asplenium trichomanes*, *Campanula carpatica*, *Cystopteris fragilis*, *Moehringia muscosa*, *Poa nemoralis*, *Polypodium vulgare*, *Sedum vulgare*) were researched in Bistra Valley.

The adult butterflies were collected in all these type of habitats but also in roadsides, abandoned places (eg. a plum orchard) where they also occur abundantly.

## Results and discussions

The habitats with different phytocoenoses and local climate offer favourable conditions for lepidoptera fauna. A total of 85 species of butterflies (S. ord. Rhopalocera) were recorded until present in the hilly zone of Țarcu Mountains. Systematic list of the species, accompanied by data about the collecting sites, habitat, the flying period of the adults and the geographical spreading are present. The systematic and scientific nomenclature used in this checklist is after RÁKOSY 2002 and SZÉKELY 2008.

**Table 1-** Checklist of the Butterflies identified in the habitats of the north-eastern part of Țarcu Mountains (Southern Carpathians)/ Lista sistematică a fluturilor diurne identificați în habitate din partea nord-estică a Munților Țarcu (Carpații Meridionali).

Taxa	BI	Bu	Z	H	E.E.	L.F.	G.S.	F.P.
HESPERIIDAE								
<i>Erynnis tages</i> (Linnaeus, 1758)	+	+	+	3,5	M	Fabaceae	Eua	V-VI
<i>Pyrgus carthami</i> (Hübner, 1813)	+	+	+	1,3,5	Xt	Potentilla	E.Was	VI-VIII

Taxa	Bl	Bu	Z	H	E.E.	L.F.	G.S.	F.P.
<i>Pyrgua alveus alveus</i> (Hübner, 1803)	+	-	+	1, 2,3, 5	M,Mh	Potentilla, Helianthe-mum	Eua	VI-VII
<i>Pyrgus malvae</i> <i>malvae</i> (Linnaeus, 1758)	+	+	+	1,2,3,5	M	Rosaceae	Eua	V-VI; VII
<i>Carterocephalus</i> <i>palaemon</i> Pallas, 1771	-	+	+	3,5	M	Poaceae	Eua	V-VI
<i>Thymelicus lineola</i> (Ochsenheimer, 1808)	+	+	+	1,3	M	Poaceae	Eua	V-VIII
<i>Thymelicus sylvestris</i> (Poda, 1761)	+	+	+	3	M	Poaceae	Eua	V-VIII
<i>Hesperia comma</i> (Linnaeus, 1758)	+	+	+	3,5	M	Poaceae	Hol	VI-VII
<i>Ochlodes venatus</i> <i>faunus</i> (Turati, 1905)	+	+	+	3,5	M	Poaceae	Eua	VI-VIII
PAPILIONIDAE								
<i>Parnassius</i> <i>mnemosyne</i> <i>transsylvanica</i> (Schmidt, 1930)	-	-	+	3	M	Papaveraceae	End	VI-VII;
<i>Papilio machaon</i> (Linnaeus 1758)	+	+	+	3	M	Apiaceae	Eua	V-VIII
<i>Iphiclides podalirius</i> <i>podalirius</i> (Scopoli, 1763)	+	+	+	3	Mxt	Rosaceae	Eua	V-VIII
PIERIDAE								
<i>Leptidea sinapis</i> <i>sinapis</i> (Linnaeus, 1758)	+	+	+	1,2,3,5	M	Fabaceae	Eua	IV-IX
<i>Anthocharis</i> <i>cardamines</i> (Verity, 1908)	+	+	+	3	M	Brassicaceae	Eua	IV-V
<i>Aporia crataegi</i> <i>crataegi</i> (Linnaeus, 1758)	-	-	+	3	M	Rosaceae	Eua	V-VI
<i>Pieris brassicae</i> <i>brassicae</i> (Linnaeus, 1758)	+	+	+	1,3	M	Brassicaceae	Eua	IV-VIII
<i>Pieris rapae rapae</i> (Linnaeus, 1758)	+	+	+	1,2,3,5,6	M	Brassicaceae	Hol	IV-IX
<i>Pieris napi napi</i> (Linnaeus, 1758)	+	+	+	1,2,3,5,6	M	Brassicaceae	Eua	IV-V; VI-IX
<i>Pontia edusa</i> (Fabricius, 1777)	+	+	+	1,2,3,5	M	Resedaceae Brassicaceae	Eua	IV-IX
<i>Colias hyale</i> (Linnaeus, 1758)	+	+	+	1,2,3	M	Fabaceae	Eua	V-IX

Taxa	BI	Bu	Z	H	E.E.	L.F.	G.S.	F.P.
<i>Colias croceus</i> (Fourkroy, 1785)	+	+	+	1,2,3,5	M	Fabaceae	Eua	IV-IX
<i>Gonepteryx rhamni rhamni</i> (Linnaeus, 1758)	+	+	+	3	M	Frangula alnus Rhamnus ca- tharticus	Eua	III-IX
LYCAENIDAE								
<i>Hamearis lucina</i> (Linnaeus, 1758)	+	+	+	3	M	Primula	E	VI-IX
<i>Lycaena phlaeas</i> (Linnaeus, 1761)	+	+	+	3,5	M	Polygonaceae	Eua	V-IX
<i>Lycaena dispar rutila</i> (Werneburg, 1864)	+	-	+	3,5	Tf, Hg	Polygonaceae (Rumex sp)	Eua	VI-VII
<i>Lycaena virgaureae</i> (Linnaeus, 1758)	+	+	+	2,3,5	Mh	Polygonaceae (Rumex sp)	Eua	VII-VIII
<i>Lycaena tityrus tityrus</i> (Poda, 1761)	+	-	+	3,5	M	Polygonaceae (Rumex sp)	Eua	VI-VIII
<i>Lycaena alciphron alciphron</i> (Rottemburg, 1775)	+	-	-	2,3,5	Mh	Polygonaceae	Eua	VI-VIII
<i>Thecla betulae</i> (Lynnaeus, 1758)	+	-	-	3	M	Prunus spinosa	Eua	
<i>Callophrys rubi</i> (Lynnaeus, 1758)	+	+	+	3,5	Mt	Herbaceous plants and shrubs	Eua	VI-VII
<i>Satyrium w-album</i> (Knoch, 1782)	+	-	-	3	M	Ulmus glabra	Eua	V-VII
<i>Satyrium pruni</i> (Linnaeus, 1758)	+	+	-	3	M	Prunus spinosa	Eua	VI-VII
<i>Everes argiades</i> (Pallas, 1771)	+	+		3	M	Fabaceae	Eua	V-VIII
<i>Celastrina argiolus</i> (Linnaeus, 1758)	+	+	+	3	M	Herbaceous plants and shrubs	Hol	V-VI; VIII- IX
<i>Scoliantides orion lariana</i> Fruhstorfer, 1910	+	-	-	6	Xt	Sedum sp.	Eua	VII-VIII
<i>Glaucopsyche alexis</i> (Poda, 1761)	+	+	+	2,3,4,5	Mh	Fabaceae	Eua	V-VII
<i>Maculinea arion</i> (Linnaeus, 1758)	-	-	+	2	Mh	Thymus serpyllum	Eua	VII-VIII
<i>Plebejus argus</i> (Linnaeus, 1758)	+	+	+	1,3	M	Fabaceae	Eua	V-VI; VII- VIII
<i>Aricia agestis</i> (Denis & Schiffermuller, 1775)	+	+	+	3	Mxt	Herbaceous plants	Eua	V-VI; VII- VIII
<i>Polyommatus icarus</i> (Rottemburg, 1775)	+	+	+	1,2,3,4,5	M	Fabaceae	Eua	V-IX

Taxa	Bl	Bu	Z	H	E.E.	L.F.	G.S.	F.P.
NYMPHALIDAE								
<i>Argynnis paphia</i> (Linnaeus, 1758)	+	+	+	1,3,4,5	M	Violaceae	Eua	VII-VIII
<i>Argynnis aglaja</i> (Linnaeus, 1758)	+	+	+	1,3,5	M	Violaceae	Eua	VII-VIII
<i>Argynnis adippe</i> (Denis & Schiffmuller, 1775)	+	+	+	1,3	M	Violaceae	Eua	VII-VIII
<i>Argynnis niobe niobe</i> (Linnaeus, 1758)	+	+	+	1,3,5	M	Violaceae	Eua	VII-VIII
<i>Issoria lathonia</i> (Linnaeus, 1758)	+	+	+	1,3,4,5	M	Violaceae	Eua	VI-VIII
<i>Brenthis daphne</i> (Denis & Schiffmüller)	+	+	+	3,5	M	Rubus sp.	Eua	VI-VII
<i>Brenthis hecate</i> (Denis & Schiffmuller, 1775)	+	-	+	3,5	M	Filipendula ulmaria	Eua	VI-VII
<i>Boloria euphrosyne</i> (Linnaeus, 1758)	+	+	+	3	M	Violaceae	Eua	IV-V; VII- VIII
<i>Boloria selene</i> (Denis & Schiffmüller, 1775)	+	+	+	1,3,5	M	Violaceae	Eua	V-VI; VII- VIII
<i>Boloria dia dia</i> (Linnaeus, 1767)	+	+	+	1,3,4,5	M	Violaceae	Eua	V-IX
<i>Vanessa atalanta</i> (Linnaeus, 1758)	+	+	+	3	M	Urtica	Hol	V-IX
<i>Vanessa cardui</i> (Linnaeus, 1758)	+	+	+	3,5	M	Herbaceous plants	Cosm	V-IX
<i>Inachis io</i> (Linnaeus, 1758)	+	+	+	1,3,4,5	M	Urtica	Eua	III-VIII
<i>Aglais urticae</i> (Linnaeus, 1758)	+	+	+	3,5	M	Urtica	Eua	V-VIII
<i>Polygonia c-album</i> (Linnaeus, 1758)	+	+	+	3	M	Herbaceous plants and shrubs	Eua	III-VIII
<i>Araschnia levana</i> (Linnaeus, 1758)	+	+	+	3	Mh	Urtica	Eua	V-VI; VII- VIII
<i>Nymphalis polychloros</i> (Linnaeus, 1758)	+	-	-	4	M	Salix, Populus, Prunus, Crataegus, Sorbus	Eua	VI-VIII
<i>Nymphalis antiopa</i> (Linnaeus, 1758)	+	+	+	3,4	M	Salicaceae	Hol	III-VI
<i>Euphydryas maturna partiensis</i> (Varga, 1973)	-	-	+	3	M	Fraxinus excelsior, Plantago lanceolata, etc.	Eua	VI

Taxa	BI	Bu	Z	H	E.E.	L.F.	G.S.	F.P.
<i>Euphydryas aurinia</i> (Rottemburg, 1775)	-	-	+	3	Mh		Eua	V
<i>Melitaea cinxia</i> (Linnaeus, 1758)	+	+	+	1,3,5	M	Plantago sp.	Eua	V-VII
<i>Melitaea phoebe</i> (Denis & Schiffermuller, 1775)	+	+	+	1,2,3,5	Mt	Centaurea,	Eua	V-IX
<i>Melitaea didyma</i> (Esper, 1778)	+	+	+	1,3,4,5	M	Herbaceous plants	Eua	V-IX
<i>Melitaea athalia</i> (Rottemburg, 1775)	+	+	+	1,2,3,4,5	M	Herbaceous plants, Plantago	Eua	V-VI; VIII- IX
<i>Lymenitis camilla camilla</i> (Linnaeus, 1764)	+	-	-	3	M	Lonicera sp.	Eua	VI-VIII
<i>Neptis hylas</i> (Linnaeus, 1758)	+	+	+	3	M	Lathyrus vernus	Eua	V-VI; VII-VIII
<i>Neptis rivularis</i> (Scopoli, 1763)	+	+	+	3	M	Spiraea chamaedryfolia	Eua	V-VII
<i>Apatura iris</i> (Linnaeus, 1758)	+	+	+	4	Mh	Salicaceae	Eua	VII
<i>Apatura ilia</i> (Denis & Schiffermuller, 1775)	+	+	+	4	Mh	Salicaceae	Eua	VII-VIII
<i>Pararge aegeria tircis</i> Butler, 1867	+	+	+	1,3,5	M	Poaceae	Eua	V-IX
<i>Lasiommata megera megera</i> (Linnaeus, 1767)	+	+	+	3	M	Poaceae	Eua	V-IX
<i>Lasiommata maera maera</i> (Linnaeus, 1758)	+	+	+	3	M	Poaceae	Eua	V-IX
<i>Coenonympha arcania arcania</i> (Linnaeus, 1761)	+	+	+	1,3,5	M	Poaceae	Eua	VI-IX
<i>Coenonympha glycerion glycerion</i> (Borkhausen 1788)	+	+	+	1,3,4,5	M	Poaceae	Eua	VI-VIII
<i>Coenonympha pamphilus</i> (Linnaeus, 1758)	+	+	+	1,3,4,5	M	Poaceae	Eua	V-X
<i>Pyronia tithonus tithonus</i> (Linnaeus, 1767)	-	-	+	2,3,4,5	Mh	Poaceae	Eua	V-VIII

Taxa	BI	Bu	Z	H	E.E.	L.F.	G.S.	F.P.
<i>Aphantopus hyperantus</i> Linnaeus, 1758)	+	+	+	3	M	Poaceae	Eua	V-X
<i>Maniola jurtina jurtina</i> (Linnaeus, 1758)	+	+	+	3,4,5	M	Poaceae	Eua	V-IX
<i>Hyponephele lycaon</i> (Rottemburg,1775)	-	-	+	3	M	Poaceae	Eua	VII
<i>Erebia aethiops aethiops</i> (Esper, 1777)	+	+	+	3	M	Poaceae	Eua	VII-VIII
<i>Erebia ligea nikostrate</i> (Fruhstorfer, 1909)	+	+	+	1,2,3,4,5	M	Poaceae	Eua	VII-VIII
<i>Erebia medusa psodea</i> (Hübner, 1804)	+	+	-	3	M	Poaceae	Eua	VII
<i>Melanargia galathea</i> (Linnaeus, 1758)	+	+	+	1,2,3,5	M	Poaceae	Eua	VI-VIII
<i>Minois dryas</i> (Scopoli, 1763)	+	+	+	3	M	Poaceae	Eua	VI-VIII
<i>Hipparchia fagi</i> (Scopoli, 1763)	+	+	+	3	M	Poaceae	Eua	VI-IX
<i>Hipparchia semele</i> (Linnaeus, 1758)	+	+	+	3	M	Poaceae	Eua	VI-VIII
<i>Brintesia circe pannonica</i> (Fruhstorfer, 1911)	-	-	+	3	M	Poaceae	Eua	VI-VIII

**Abbreviations:** Sites: BI- Bistra Valley; Z-Zeicani Valley; Bu-Bucovița Valley; Habitats: 1: Mesophilous meadows 2. Mesohygrophilous meadows 3. The edge of the deciduous forests 4. Alder and Salix communities 5. Hydrophilous tall-herb fringe communities; 6. Rocks with mesophilous vegetation; E.E.=Ecological exigencies: M-Mesophilous species; Mh: Mesohygrophilous species; Mxt: Mesoxerothermophilous species; Xt: Xerothermophilous species; Tf: Tyrphophilous species; Hg: Hygrophilous species; G.S.= Geographical spreading; Eua: Euroasiatic; Hol: Holarctic; E: European; End: Endemic species.

Most of species belong to the family of Nymphalidae (46 species, including Satyrinae) and Lycaenidae (18 species) (Fig. 1). Regarding the habitats we mention that the most butterflies prefer the edge of the deciduous forests, the mesophilous meadows. In July and August a lot of species have been seen visiting the flowers of tall-herb fringe communities at Florosu Valley (affluent of Bistra river).



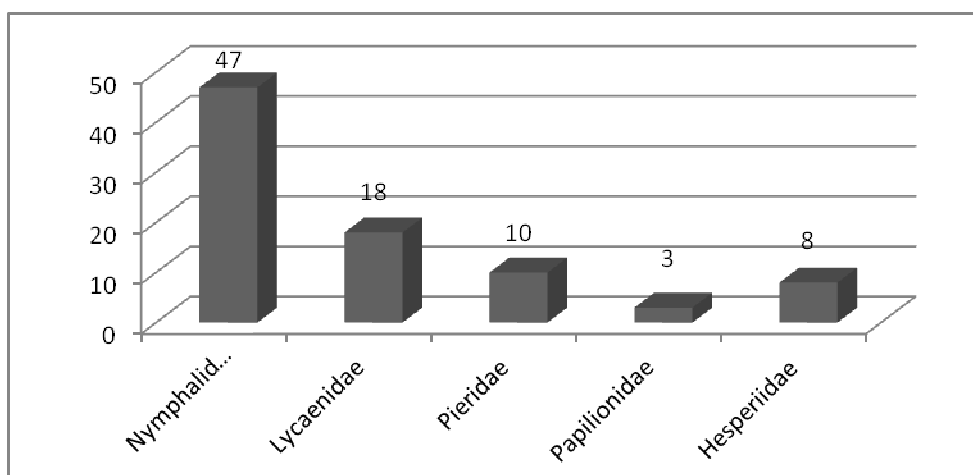


Fig. 1. Number of species related to the families of Rhopalocera Sord./Numărul de specii raportat la familiile subordinului Rhopalocera

At the edge of the deciduous and mixed forests frequent species are *Pyrgus carthami*, *Pyrgus malvae malvae*, *Erynnis tages*, *Thymelicus sylvestris*, *Thymelicus lineola*, *Ochlodes venatus faunus*, *Anthocharis cardamines*, *Hamearis lucina*, *Lycaena phlaeas*, *Callophrys rubi*, *Argynnis paphia*, *Polygonia c-album*, *Araschnia levana*, *Aglais urticae*, *Neptis hylas*, *Pararge aegeria tircis*, *Lasiommata megera*, *Hipparchia fagi*, *Erebia aethiops*, *Minois dryas*, *Limenitis camilla camilla*, *Lasiommata maera*, *Aphantopus hyperantus*.

*Apatura iris* and *Apatura ilia* prefer open woodland, forest edges and hedgerows, feeding on carrion, dung and tree sap.

In meadows, the most common species are *Hesperia comma comma*, *Erynnis tages tages*, *Melanargia galathea*, *Coenonympha arcania arcania*, *Coenonympha pamphilus pamphilus*, *Polyommatus icarus*, *Melithaea athalia athalia*, *Melitaea phoebe*, *Boloria selene*, *Boloria dia dia*, *Boloria euphrosyne*, *Melitaea cinxia*, *Leptidea sinapis sinapis*, *Pieris rapae*, *Pieris napi*, *Pontia edusa*, *Colias croceus* and *Colias hyale*.

*Lycaena dispar rutila*, *Lycaena virgaureae virgaureae*, *Araschnia levana* are very common in mesohygrophilous meadows and tall herb fringe communities in Bistra Valley and its affluent (Florosu Valley). The adults frequent especially *Mentha aquatica*, *Epilobium angustifolium* and *Eupatorium cannabinum*.

All butterflies we identified in this area feed on plants in their larval stage. Most of them are oligophagous (67 species) and monophagous (7 species) but some species are polyphagous (11 species). Monophagous species are *Thecla betulae*, *Satyrium w-album*, *Satyrium pruni*, *Maculinea arion*, *Brenthis hecate*, *Neptis hylas* and *Neptis rivularis*. These species are limited to particular habitats and form local colonies where their host plants (*Prunus* sp.) occur.

Oligophagous species are especially Nymphalids but also Pierids, Lycaenids and some of Hesperidae: *Apatura iris*, *Apatura ilia*, *Boloria euphrosyne*, *Boloria dia*, *Argynnis paphia*, *Argynnis adippe*, *Melitaea cinxia*, *Melitaea athalia*, *Erebia aethiops*, *Erebia medusa psodea*, *Melanargia galathea*, *Aphantopus hyperanthus*, *Maniola jurtina*, *Minois dryas*, *Hipparchia semele*, *Pieris brassicae*, *Pieris rapae*, *Pieris napi*, *Lycaena dispar rutila*. So that, Poaceae are preferred by Satyrinae species and some Hesperidae as *Erebia aethiops*, *Erebia medusa psodea*, *Erebia ligea carthusianorum*, *Minois dryas*, *Hipparchia*

*semele*, *Brintesia circe pannonica*, *Ochlodes venatus faunus*, *Hesperia comma*, *Thymelicus sylvestris*, etc. Brassicaceae and Fabaceae are host plants for different species of Pieridae and Lycaenidae as *Erynnis tages*, *Leptidea sinapis*, *Colias hyale*, *Plebejus argus*, *Polyommatus icarus*, *Pieris brassicae*, *Pieris rapae*, *Pieris napi napi*. Rhamnaceae are host plants for *Gonepteryx rhamni*. Violaceae are host plants for *Argynnis paphia*, *Argynnis aglaja*, *Argynnis adippe* and *Issoria lathonia*. Urtica species are host plants for *Vanessa atalanta*, *Vanessa cardui*, *Inachis io* and *Aglais urticae*. Larvae of *Iphiclides podalirius* feed on Prunus and related Prunus species. Polyphagous butterflies species eat a broad range of plants from unrelated families. An example is *Vanessa cardui*, for which more than 100 host plants from various families, including the asters, legumes, and mallows, have been recorded.

Adult butterflies prefer various plants as nectar source, which can differ between species. The choice of plants as nectar sources by butterflies depends on various factors, including innate colour preferences. The effectiveness of butterfly foraging depends in part on corolla depth, clustering of flowers, but also on proboscis length, which limits the range of flowers from which nectar can be extracted. The floral scent is an important cue signal used by butterflies initially to identify and subsequently to recognize and distinguish among rewarding plants (DÓSA 1999, ANDERSSON 2003, BAKOWSKI & BORON 2005).

Adult butterflies feed especially on nectar of flowers but some species, like *Inachis io*, *Vanessa atalanta*, *Apatura iris*, *Apatura ilia* feed on other substances like: carrion, dump, tree sap, rotting fruits. *Thecla betulae* prefers aphid "honeydew" secretions (STILL 1996).

At Zeicani Valley, in the meadows we have researched, *Thalictrum simplex* ssp. *galoides*, *Dianthus carthusianorum*, *Cirsium rivulare* and *Galium verum* were the most visited flowering plants in June and July. In Florosu Valley, in the period of the middle of July to the middle of August, the most visited flowering plants were *Epilobium angustifolium*, *Mentha aquatica*, *Mentha longifolia* and *Telekia speciosa*.

In the hilly area of Bistra Valley, *Sambucus racemosa*, *Lotus corniculatus*, *Potentilla reptans*, *Tanacetum vulgare*, *Vicia faba*, *Leucanthemum vulgare*, *Galium verum*, *Origanum vulgare*, *Prunella vulgaris*, *Filipendula hexapetala*, *Teucrium montanum*, *Eryngium campestre*, *Aster lynosiris*, *Dianthus carthusianorum*, *Euphorbia cyparissias*, *Salvia glutinosa*, *Hypericum perforatum* are the most important flowering plants used as nectar sources for butterflies.

Most of the identified species are very common in Romania as *Pieris napi*, *Pieris rapae*, *Melitaea athalia*, *Melitaea didyma*, *Melitaea cinxia*, *Erynnis tages*, *Hesperia comma*, *Ochlodes venatus faunus*, *Colias hyale*, *Argynnis paphia*, *Argynnis aglaja*, *Argynnis adippe*, *Maniola jurtina*, *Aphantopus hyperantus*, etc.

Endemic taxon is *Parnassius mnemosyne transsylvanica* SCHMIDT, 1930 - This subspecies was identified in mesohygrophilous and mesophilous meadows, in the neighborhood of Zeicani locality. The adults fly in May-July. Larvae feed on *Corydalis* sp. and develop their stage in May. *Parnassius mnemosyne* is protected by law in several countries of Europe. In Romania this taxon is protected by law according 4A Annex of Emergency Ordinance of Romanian Government 57/2007.

In the studied area studied, rare species is *Thecla betulae* (LINNAEUS, 1758) (1 ♂ 28.08.2009, 1 ♀, Bistra Valley, 1.X. 2009). It is a monovoltine species and very rare in the hilly area of Bistra Valley, upstream Bucova locality. The adults of this species spend much of their time resting and basking in shrubs and trees. They fly in August-September but we found two specimens in the first decade of October, in the area of alder trees. Both females and males feed on honey dew. Female lays her eggs on *Prunus spinosa* in late

August which overwinter. Larvae feed on *Prunus spinosa*. Pupae are attended by ants (*Lasius niger*).

*Lycaena dispar rutila* (WERNEBURG, 1864) - It is a common species that we found especially in Bistra and Zeicani Valley. The adults fly in June-July and in the first decade of August (Fig. 5). They prefer mesohygrophilous meadows and tall-herb fringe communities with *Mentha aquatica*, *Epilobium hirsutum*, *Eupatorium cannabinum* and *Petasites hybridus*.

*Euphydryas maturna partiensis* VARGA, 1973 – 3♂♂ at June 18, 2009; 6 ♂♂, 2♀♀ at June 11, 2010. Individuals of this species were observed at the edge of a beech forest and in a plum orchard near Zeicani Valley. The adults fly in May and rest on leaves of *Prunus domestica*. Many individuals were also observed resting on the ground or feeding drop-pings. Larvae develop in June and overwinter. Larval food plant consists on *Betula*, *Salix*, *Fraxinus*, *Ligustrum*, *Scabiosa*, etc. In Hunedoara County it was also found in Retezat Mountains and Poiana Ruscă Mountains (RÁKOSY 1997; BURNAZ SILVIA 2002).

In several European countries, *Euphydryas maturna* is considered as an endangered species. In Romania, *Euphydryas maturna partiensis* is also considered as a vulnerable species (according IUCN categories of endangerment) (RÁKOSY 2002) and it is protected by law according 3 and 4 Annex of Emergency Ordinance of Romanian Government 57/2007. *Euphydryas aurinia aurinia* (ROTTEMBURG, 1775) – 2 ♂♂ were collected from June 11, 2010, in a mesohygrophilous meadow situated between Sarmizehetusa and Zeicani localities. It is a rare species in this area. It is considered as an endangered species according to the Red list of Romanian butterflies (RÁKOSY 2002). This subspecies is also listed in 4 Annex of OUG 57/2007 (species that have a community interest).

*Brenthis daphne daphne* (DENIS & SCHIFFERMÜLLER, 1775) - It is a common species. Adults frequent flowering meadows, bush areas, the edge of the deciduous forests and fly in June-August. Larvae feed on *Rubus fruticosus* and *Rubus idaeus*. According to the Red List of Romanian Butterflies it is a vulnerable species (RÁKOSY 2002).

*Brenthis hecate* (DENIS & SCHIFFERMÜLLER, 1775) - It is a relatively common species in this area. The adults fly in June-August and prefer the edge of the forests and shrub areas. Larvae feed on *Filipendula ulmaria* (TOLMAN & LEWINGTON 1997).

*Neptis hylas* (LINNAEUS, 1758) – This species is very common in the hilly area of Bistra, Bucovița and Zeicani Valley. The adults fly in May-June and July-August. They have been seen resting on leaves of *Rubus caesius*, *Sambucus nigra* and *Crataegus monogyna*. Larvae feed on *Lathyrus vernus*.

## Conclusions

86 species belonging to Rhopalocera were reported from the north-eastern part of Țarcu Mountains.

In accordance with the applicable criteria formulated by the IUCN Red List of diurnal Lepidoptera in Europe and the Red List for diurnal butterflies in Romania (RÁKOSY 2003), researches have shown that most species are not endangered, with dense populations. This situation is due to the ecological valency of the species, mostly mesophilous, with moderate requirements over temperature and humidity. In addition, natural habitats less modified by humans exist. Here, adults can find many plants used as sources of nectar and larvae can find their host plants.

Some species as *Euphydryas maturna partiensis*, *Euphydryas aurinia aurinia*, *Lycaena dispar rutila*, *Lycaena alciphron*, *Satyrrium w-album*, *Thecla betulae*, *Parnassius mnemosyne transsylvanica*, *Satyrrium w-album*, *Satyrrium pruni*, *Brenthis daphne*, *Brenthis*

*hecate*, *Apatura ilia*, *Apatura iris* are listed as vulnerable, near threatened or endangered species in the Red List of Butterflies of Romania (RÁKOSY 2002).

*Euphydryas maturna partiensis*, *Euphydryas aurinia aurinia*, *Parnassius mnemosyne transsylvanica*, *Neptis hylas* and *Lycaena dispar rutila* are listed in the 3 and 4 Annexes of the Emergency Ordinance of the Romanian Government as species of national end community interest.

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