

Lepidoptera (Insecta: Lepidoptera) IN THE COLLECTION OF DANIEL CZEKELIUS FROM NATURAL HISTORY MUSEUM OF SIBIU, COLLECTED FROM "DUMBRAVA SIBIULUI" FOREST, ROMANIA

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Abstract. Currently, fauna and ecological analysis of the landscape in which the reserves and Forest "Dumbrava Sibiu" shows a great scientific interest and practical for biological research in Sibiu. The results can contribute substantially to assessing the state of the world of insects and their evolution in the ecosystem studied, but also to establish their quantitative and qualitative changes over time. In the present work was studied the Lepidoptera collection of Transylvania Dr. Daniel Czekelius, and the paper presents a systematic list of species collected Macrolepidoptere since 1888-1929 in Forest "Dumbrava Sibiu".

This paper can be considered a tribute and memory of Dr. Daniel Czekelius entomologists, who through his collection has contributed substantially to the knowledge of this group of insects. The data obtained and to join the collections of personal data between 2000-2011 we intend to achieve a more comprehensive study, which will be subject to further research on the evolution Macrolepidoptera over more than 120 years of research in the area of Forest "Dumbrava Sibiu". For some species have been listed by the IUCN recommended levels of endangerment in 2000 and 2001 Rákósy L.: extinct, taxon vulnerable, near threatened.

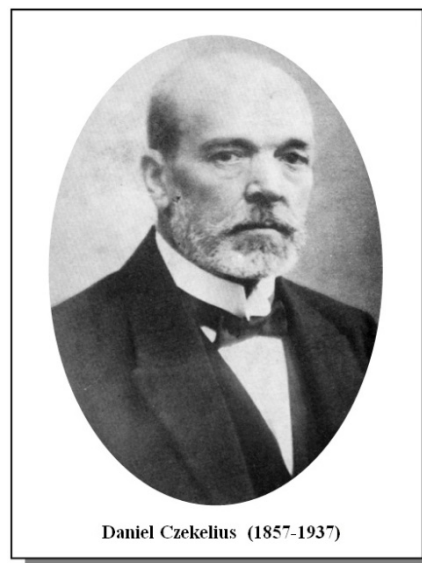
Keywords: butterflies, biodiversity, Forest "Dumbrava Sibiului", Dr. Daniel Czekeliu collections.

INTRODUCTION

Butterflies (*Insecta: Lepidoptera*) belong to the best studied group of invertebrates in Romania. Data about their distribution appear in many papers concerning particular parts of the country, especially national and landscape parks, nature reserves, and other areas which are attractive as far as nature is concerned, as well as in the vicinity of cities [3-14, 23, 24, 25, 26-28, 29-35] In the present investigation was studied and indexed collection above mentioned species were caught only from Forest "Dumbrava Sibiului" in 1888-1936 in Sibiu. Research has been conducted on the material currently existing in the collection of Lepidoptera from Transylvania Dr. Daniel Czekelius collection which is located at the Natural History Museum in Sibiu. Besides the analyzed material was walking and literature and all the papers published by Dr. Daniel Czekelius scientific papers in the volume of the museum "Verhandlungen und Mitteilungen des siebenbürgischen Vereins für Naturwissenschaften zu Hermannstadt" [3-14].

Dr. Daniel Czekelius is considered the best butterfly researcher and expert in Transylvania, even though he was a doctor, hospital director in Sibiu. Still young, he showed a great attraction to the wonderful world of butterflies, which he gradually devoted all his spare time. Become a member of the "Transylvanian Society of Natural Sciences' Department of Entomology and helping organize and prepare Lepidoptera collection of the Museum Society, this collection is striving to develop more complete and contain as much as possible, all species so far reported Transylvania. In 1892 he published a paper on Macrolepidoptera of Sibiu and its surroundings, the paper published in the journal Museum [3] which included a total of 457 sp. data collection, date and place, and sometimes biological data on the length of the stern, which leads to the conclusion that he grew himself some species and observed their development

precisely. 5 years later came the first catalog of wildlife with the title "Critical Overview of butterfly in Transylvania" [4] which included a total of 1141 species of butterflies.



The second and last time in the same general list of butterfly known from Transylvania, appears under the modest title of "Contributions to the fauna of Lepidoptera of Transylvania". This includes 2114 species of Macro-and Microlepidoptere, given the first records for Transylvania each species. In subsequent work Contribution to the Lepidoptera fauna of Transylvania add new species so that in his in his report on the Company whose collections lepidopterists became curator said: "Our collection comprises nearly 2,000 species, yet it must be said that this is not full, as are known about Transylvania. 2200 species[12-14]. Our collection activity must be continued so that, in comparison with well-studied areas, to increase knowledge of the number of species-living species in our area from 2800-3000 " In Transylvania at that time

in addition to the collection of J. v. Franzen's butterflies were also known: Körnung's collection from Evangelical School of Brasov, which though very rich was unusable, as no data on the collection, collection Robert Klement from Valcea, rich in species and neatly labeled, and sets Prof. Fr. Sachsenheim and Dr. Karl V. Petri and the collection of Dr. D. Czekelius Sighisoara Sibiu, the ranking among the largest and most cared for. However these illustrious collectors were members of the Transylvanian Society of Sibiu and its rich material collected by Dr. D. Czekelius provided numerous data, which has resulted in the first complete catalog of research on the butterfly, made in Transylvania, he was reported 795 species and 63 forms and microlepidoptere macro, based on data collected from papers published so far thanks: K. Fuss, JV Franzen, Otto Hermann, János Frivaldszky Géza János Korváth and Paul, Dr. Pachineger and personally collected material. Later continue to collect new data and expand research to other places far from Sibiu, maintaining or collecting exchange links with all other amateur researchers from Transylvania, receives more material from the Avrig Silbernagel, and Petri Sachsenheim of Sighisoara, Deubel Brasov, in one of his trips to famous mountains meet lepidopterists Retezat Dioszeghi of Ineu. Collaborates with Professor Rebel, the famous Museum lepidopterists in Vienna, Transylvania fauna was interested and involved in several trips in this area. Latest papers published during 1922-1943[12,13,14]. bring new data about the spread of the species of the genus Apollo Czekelius dealt specifically. In 1907 Dr. H. Rebel itself, teacher and curator at the Museum of Vienna, Dr. D. Czekelius responds to the invitation and came to Sibiu where, together with other members of the Society, make a couple of trips and collecting butterflies Păltiniș Cindrel in the surroundings of Sibiu, Brasov and Fagaras Mountains, Bucegi and reaching, in 1908 the magazine published the results of investigations made in the Vienna Museum, by signaling a further 23 species are new to Transylvania, describes this occasion and Erebor epiphron Transsylvania-both subspecies characteristic of the Carpathians. Major Albert Prall, a prominent member of the Company, continued to collect in the surroundings of Sibiu and coat step, gradually forming a remarkable collection of microlepidoptere, at that time one of the most comprehensive of Transylvania student E. Gross and he continues to collect in the surroundings of Cluj and Sibiu, Transylvania and then in the Plain, including Geaga and Sucutard and Karl Alberti, secondary school teachers in Bistrita, a collection of butterflies leave school in town, this material is then processed and recorded regularly by Dr. D. Czekelius

At the instigation of Ch Baron Rothschild in London since 1911, Karl Predota systematically collected in the Transylvania Plain, a rich material on which Rothschild in 1912 AD Review published in volume 62 of the Company "Transylvanian Plain butterfly" a list 710 species of macro-and microlepidoptere, this being the first systematic

investigation of a Transylvanian region have been reported due to which more than 100 new species for fauna of Transylvania.

A. Schmidt, curator of the Museum of Budapest Sucutard collected from Fagaras Mountains and the material is made available to Dr. D. Czekelius for registration. Dr. Z. Szylady, a professor at Calvin College in Aiud, raised especially in this region, Ocna Sibiu and the Transylvanian Alps, the collection is also available to Dr. D. Czekelius for study. The same collection of P. Tiltscher, lawyer, who collected the St. George and surrounding cities Borsec[14].

All these collectors and personal data were recorded by Dr. D. Czekelius rigorously working with intensity and during World War I, the results of supplementing them with data published by Pax Ferdinand Jr., who in 1906 published the comments very Breslau important to the "butterfly Rodnei Massif. Thus, because many amateur collectors but passionate number of known species of Lepidoptera in Transylvania at that time had grown more strong, that their publication was a new catalog of basic necessities. Thus, Dr. D. Czekelius done it in 1918 publishing the complete list of the Society vol 67 [12] localities of collection of all known species of Lepidoptera in Transylvania up to the date. The value of this catalog is very high today, it was reported species of macro and Microlepidoptere 1095, the date of occurrence is known species of Lepidoptera in Transylvania in 2116, and as a guarantee of data in this catalog, it states that all material has been reviewed or even caused by the great Viennese lepidopterists H. Rebel.

As a summary of the activity conducted under a Department of Entomology Society during the 50 years from 1935 to 1936 in volume, Dr. D. Czekelius publishes "Overview of the Company's collection of butterflies' in dealing with the origin of the Lepidoptera fauna of Transylvania. His work is embodied in lepidopterologiei in 18 papers published in the Journal of the Society. On 22 August 1938 at age 81, died leaving a vivid memory embodied by the beautiful collection of macro-and microlepidoptere he made it in the Transylvanian Society Museum of Natural Sciences of Sibiu. This collection consists of two separate parts[18].:

1. A special collection of butterfly Transylvanian comprising exclusively material comes from Transylvania (about 7162 copies. 2100 species).

2. A general collection that includes material paleartic Transylvania near the material obtained from the exchange relations (with 6929 copies). Check lepidopterists research in Transylvania [18] includes all "our fauna has over 2,400 species determined with certainty with many varieties, forms and aberrations. The bricks have been collected, has been the cornerstone of building plans at least in large part was recognized. Who leads the construction of the lepidopteran fauna of Transylvania? "

Immediately after his death and the outbreak of the 2nd World War, there were favorable conditions for further research in Transylvania butterfly. Fortunately

collections have not suffered from the war by the Company due care and its museum curators.

Both Czekelius's collections, which they have consulted staff is still in good condition (well maintained) in the Natural History Museum in Sibiu and have a great documentary value. Comparative collections are particularly important for Transylvania and the Romanian General lepidoptero fauna. They include copies (samples) for almost the entire fauna in Transylvania. Their value lies in the fact that most data collection are still unpublished and unused in the collection.

Some families and many species have been verified in recent years by specialists and relatively few data were published in papers scattered fauna, taxonomic. [19,24,25]. Macrolepidoptera Czekelius collection of typed material there, which I found to study data collection of specimens of Sibiu Grove. Microlepidoptera data collection is a comprehensive list, the manuscript. Although Rebel ensure close collaboration with Prof. determinations, however, requires a systematic review and update of nomenclature for most families, genera and species. They have been made in recent years partly and various specialists in the country and abroad.

MATERIALS AND METHODS

The material presented comes from the entomological collection of Daniel Czekelius preserved in the Natural Instore Museum in Sibiu. The 4474 three

specimens were collected during the years 1888-1936 by Daniel Czekelius from Transylvania, around Sibiu specifically from the Forest Grove area of Sibiu. After consulting the collection, the determination was made after the copyright material, some species being updated bibliographic material and works by Koch M. [17], Popescu-Gorj A. [16], Laszlo Rakosy [20,21], and reference works in Romania, which includes Catalog butterfly Laszlo Rakosy, Marian Goia, Zoltan Kovacs [23].

The paper contains a systematic list of species collected Macrolepidoptera Forest Grove area of Sibiu, which are grouped into 5 families (Saturniidae, Pieridae, Nymphalidae, Satyridae, Lycaenidae,) 35 species and 42 copies respectively. For each species, besides the systematic in Gender and Family, are the year, month and day of collection. In some species according to the author is not mentioned collection day, month and year only. For some species have been listed by the IUCN recommended levels of endangerment in 2000 and 2001 Rákosy L. [22]: extinct, taxon vulnerable, near threatened.

RESULTS

After analyzing the material, these species have been identified previously reported by Dr. Daniel Czekelius [3-14]: Forest Grove area of town (species list). Situation knowledge Lepidoptera collection of Dr. Daniel Czekelius currently found in the Museum of Natural History in Sibiu, is presented in Table 1.

Table 1. Macrolepidoptera a collection of Dr. Daniel Czekelius.

Family	Number of copies	Family	Number of copies
Papilionidae	267	Saturnidae	16
Pieridae	115	Drepanidae	14
Danaidae	12	Noctuidae	1106
Nymphalidae	302	Cymatophoridae	21
Satyridae	396	Geometridae	1056
Libytheidae	2	Nolidae	20
Erycinidae	2	Cymbidae	12
Lycaenidae	317	Syntomidae	13
Hesperiidae	69	Arctidae	190
Sphingidae	55	Zygaenidae	178
Notodontidae	77	Heterogynidae	1
Lymantriidae	62	Cochilididae	9
Lasiocampidae	52	Psychidae	68
Enromididae	2	Sesiidae	23
Hepialidae	17	Total	4474

LIST OF SPECIES COLLECTED FROM FOREST GROVE SIBIU MACROLEPIDOPTERE, IN THE COLLECTION OF Dr, Daniel CZEKELIUS

FAMILY SATURNIIDAE

Genus *Cilix* Leach, 1815
(*Euclea* Hübner, [1819])

1. *Cilix glaucata* Scopoli, 1763 (sin. *spinula* [Denis & Schiffermüller])

1 ex. 13.V.1890 DC

Subfamily L A R E N T I I N A E

Genus *Xanthorhoe* Hübner, [1825]
(sin. *Melenydris* Hübner, [1825]; *Ochyria* Hübner, [1825];
Coremia Guenée, 1845; *Boremia*, erreur)

2. *Xanthorhoe ferrugata* Clerck, 1759 (sin. *X. ferrugaria* Denis & Schiffermüller, 1775, *X. unidentaria* Haworth, 1809)

1 ex., 18.VI leg. Czekelius (collection does not appear on the label of the collection year)

Subfamily ARCTIINAE

Genus **Pericalia** *Hübner, 1820* (sin. *Pleretes Lederer, 1852*)

3. Pericalia matronula *Linnaeus, 1758*
1 ex.; 29.VI.1888 DC; *Vulnerable taxon*

Genus **Diachrysia** *Hübner, [1819]* (*Euthemonia Stephens, 1828*; *Rhyparioides Butler, 1877*)

4. Diachrysia chrysitis chrysitis *Linnaeus, 1758*
8.VI.1888 DC;

Genus **Diaphora** *Stephens, 1827*

5. Diaphora mendica *Clerck, 1759* (sin. *Spilosoma m. Clerck, 1759*, *Cynia m. Clerck, 1759*)
2 ex.; 17, 22.V.1930 DC

Subfamily CALLIMORPHINAE

Genus **Callimorpha** *Latreille, 1809*
(*Euplagia Hübner, 1820*; *Panaxia Tams, 1939*)

6. Callimorpha quadripunctaria *Poda, 1761* (sin. *E. hera Linnaeus, 1758*)
2.VIII.1888 DC

Subfamily CUCULLIINAE

Genus **Dichonia** *Hübner, [1821]*
(sin. *Agriopis Boisduval, 1840*; *Griposia Tams, 1939*)
7. Dichonia aprilina *Linnaeus, 1758* (sin. *D. protea Denis & Schiffermüller, 1775*) after *Rakosy L. et al. (2003)* **Griposia aprilina** *Linnaeus, 1758*
1 ex.; 28.IX (without collecting year) leg. Czekelius

FAMILY PIERIDAE

Subfamily DISMORPHIINAE

Genus **Leptidea** *Billberg, 1820*
(sin. *Leucophasia Stephens, 1827*; *Leptosia auct; Letidia erreur*)

8. Leptidea sinapis sinapis *Linnaeus, 1758*
22.VII.1871 DC

Genus **Anthocharis** *Boisduval, Rambur Duméril & Graslin [1833]*

9. Anthocharis cardamines meridionalis *Verity, 1908*
25.V.1887 DC;

FAMILY NYMPHALIDAE

Subfamily NYMPHALINAE

Genus **Apatura** *Fabricius, 1807*
(sin. *Aeola Billberg, 1820*)

10. Apatura iris iris *Linnaeus, 1758*
2 ex.; 28.VI.1881 DC;

Genus **Limenitis** *Fabricius, 1807* (sin. *Nymphalus Boitard, 1828*; *Ladoga Moore, [1898]*)

11. Limenitis populi *Linnaeus, 1758*
5.VI.1902 DC; 10.VI.1906 DC, *Vulnerable taxon*

Genus **Neptis** *Fabricius, 1807*

12. Neptis sappho *Pallas, 1771* (sin. *N. aceris sensu Lhomme, 1924*)
7.V.1902 DC; *Vulnerable taxon*

Genus **Inachis** *Hübner, [1819]*

13. Inachis io *Linnaeus, 1758*
12.VII.1918 DC

Genus **Vanessa** *Fabricius, 1807*
(sin. *Pyrameis Hübner, [1819]*)

14. Vanessa atalanta *Linnaeus, 1758* (sin. *V. amiralis Retzius, 1783*)
20.VIII.1920 DC;

15. Vanesa cardui *Linnaeus, 1758*
16.VIII.1916 DC

Genus **Araschnia** *Hübner, [1819]*

16. Araschnia levana *Linnaeus, 1758* (sin. *A. prorsa Linnaeus, 1758*)
13.V.1920 DC, near threatened

Genus **Argynnis** *Fabricius, 1807*
Subgenus **Mesoacidalia** *Reuss, 1926*

17. Argynnis (Mesoacidalia) aglaja aglaja *Linnaeus, 1758* (sin. *M. charlotta Haworth, 1803*)
25.V.1919 DC

Subgenus **Fabriciana** *Reuss, 1920*

18. Argynnis (Fabriciana) addipe addipe *Denis & Schiffermüller, 1775*
29.VI.1927 DC, near threatened

19. Argynnis (Fabriciana) niobe niobe *Linnaeus, 1758* (sin. *A. cleodoxa Esper, 1789*)
29.VI.1917 DC, near threatened

Subgenus **Argynnis** *Fabricius, 1807*

20. Argynnis (Argynnis) paphia paphia *Linnaeus, 1758*
20.VI.1921 DC; 7.VII.1922 DC, near threatened

Genus **Melitaea** *Fabricius, 1807*
(sin. *Schoenis Hübner, [1819]*; *Cinclidia Hübner, [1819]*; *Didymaeformis Verity, 1950*; *Mellicta Billberg, 1820, parti*)

21. Melitaea cinxia cinxia *Linnaeus, 1758*
25.V.1926 DC, near threatened

22. Melitaea phoebe phoebe *Denis & Schiffermüller, 1775*
16.VI.1922 DC; 16.VIII.1921 DC, near threatened

23. Melitaea athalia athalia *Rottenburg, 1775* (sin. *M. athalia mehadiensis Gerhard, 1822*)
1 ex.; 12.V.1926 DC; near threatened

24. Melitaea didyma didyma *Esper, [1779]*
1 ex.; 5.VI.1891 DC

FAMILY SATYRIDAE

Genus **Pararge** *Hübner*, [1819]
Subgenus **Pararge** *Hübner*, 1819

25. Pararge (Pararge) aegeria tircis *Butler*, 1867
(*sin. P. aegeria egerides* *Staudinger*, 1871)
11.VI.1916 DC;

Subgenus **Lopinga** *Moore*, [1895]

26. Parage (Lopinga) achine achine *Scopoli*, 1763
26.VI.1921 DC, *Vulnerable taxon*

Subgenus **Minois** *Hübner*, 1819

27. Minois dryas *Scopoli*, 1763
2.VIII.1920 DC

Genus **Erebia** *Dalman*, 1816

28. Erebia aethiops aethiops *Esper*, 1777 (**E. aethiops fogarasica** *Warren*, 1931, *sin. E. aethiops jigodini* *Popescu-Gorj*, 1955, *sin. E. "f. mesorubria"* *Popescu-Gorj*, 1955)
22.VII.1929 DC, near threatened

Genus **Caenonympha** *Hübner*, [1819]
(*sin. Chortobius* *Dunning & Pickard*, 1858; *Sicca* *Verity*, 1953)

29. Caenonympha glycerion glycerion *Borkhausen*, 1788 (*sin. C. iphis* *Denis & Schiffermüller*, 1775, homonim invalidat)
2.VIII.1899 DC, near threatened

FAMILY LYCAENIDAE

Genus **Thecla** *Fabricius*, 1807
(*sin. Ruralis* *Tutt*, [1906]; *Zephyrus* *Dalman*, 1816; *Quercusia* *Verity*, 1943; *Aurotis* *Kirby*, 1862, *nec. Dalman*, 1816)

30. Thecla quercus quercus *Linnaeus*, 1758
20.VIII.1892 DC, *Vulnerable taxon*

Genus **Callophrys** *Billberg*, 1820

31. Callophrys rubi *Linnaeus*, 1758
1 ex.; 16.VI.1892 DC

Genus **Lycena** *Fabricius*, 1807
(*sin. Heodes* *Dalman*, 1816; *Chrysophanus* *Hübner*, 1816, *Palaeochrysophanus* *Verity*, 1943;)

32. Lycena dispar *Haworth*, 1803 (*sin. L. dispar rutila* *Werneburg*, 1864)
1 ex.; 11.VI.1879 DC, *Vulnerable taxon*

Subfamily PLEBEJINAE

Genus **Glaucopteryx** *Scudder*, 1872
(*sin. Apelles* *Hemming*, 1931)

33. Glaucopteryx alexis *Poda*, 1761
(*sin. Lycena cyllarus* *Rottenburg*, 1775)
8.VI.1915 DC

Genus **Maculinea** *von Ecke*, 1915

(*sin. Argus Boisduval*, [1832], *nec Scopoli*, 1763)

34. Maculinea alcon *Denis & Schiffermüller*, 1775
1 ex.; 29.VI.1907 DC, Extinct

Genus **Polyommatus** *Latreille*, 1804

35. Polyommatus icarus *Rottemburg*, 1775
13.VII.1888 DC

DISCUSSIONS

Data processing and their centralization in the form of systematic list of species collected in the past Macrolepidoptera perimetrical existing forest and now as a museum collection was the purpose of this paper. By centralizing alert fauna species in the forest since 1888-1929, which will add the personal collections are studying a further communication, this paper updates the state of knowledge of this group of insects around Sibiu and is aimed at achieving a "Red List" endangered and extinct species in the forest area of Sibiu Grove. Also on bibliography, add new data on these species Macrolepidoptera area around Sibiu [29-35].

After studying Lepidoptera collection in Transylvania Dr. Daniel Czekelius can draw the following conclusions appear in the aforementioned list only copies and raised in Forest Grove Sibiu macrolepidoptera only species in the families: Saturniidae, Pieridae, Nymphalidae, Satyridae, Lycaenidae, belonging to 35 species a total of 42 copies. These data are needed to assess the diversity of butterfly fauna of the forest area but also to detect extinct or endangered species, the causes leading to the disappearance or reduction of populations of these species. The oldest species in the collection of Daniel Czekelius are collected in 1888, so studies on forest fauna Macrolepidoptera Sibiu are collected from more than 123 years. The analysis of clinical material next taxon *Maculinea alcon* *Denis & Schiffermüller*, 1775 collected to date (29.VI.1907) is consistent [22] species extinction and the following species: *Pericalia matronula* *Linnaeus*, 1758 (29.VI.1888), *Limenitis populi* *Linnaeus*, 1758 (5.VI.1902; 10.VI.1906), *Neptis sappho* *Pallas*, 1771 (*sin. N. aceris sensu* *Lhomme*, 1924), 7.V.1902; *Parage (Lopinga) achine achine* *Scopoli*, 1763 (26.VI.1921), *Thecla quercus quercus* *Linnaeus*, 1758 (20.VIII.1892), *Lycaena dispar* *Haworth*, 1803 (*sin. L. dispar rutila* *Werneburg*, 1864), 11.VI.1879, *Vulnerable taxa*. The following species: *Araschnia levana* *Linnaeus*, 1758 (*sin. A. prorsa* *Linnaeus*, 1758) (13.V.1920), *Argynnis (Fabriciana) addipe addipe* *Denis & Schiffermüller*, 1775 (29.VI.1927), *Argynnis (Fabriciana) niobe niobe* *Linnaeus*, 1758 (*sin. A. cleodoxa* *Esper*, 1789), (29.VI.1917), *Argynnis paphia paphia* *Linnaeus*, 1758 (20.VI.1921, 7.VII.1922), *Melitaea cinxia cinxia* *Linnaeus*, 1758, (25.V.1926), *Melitaea phoebe phoebe* *Denis & Schiffermüller*, 1775, (16.VI.1922; 16.VIII.1921), *Melitaea athalia athalia* *Rottenburg*, 1775 (*sin. M. athalia mehadiensis*

Gerhard, 1822), 12.V.1926, *Erebia aethiops aethiops* Esper, 1777 (E. aethiops fogarasica Warren, 1931, sin. *E. aethiops jigodini* Popescu-Gorj, 1955, sin. *E. "f. mesorubria"* Popescu-Gorj, 1955), (22.VII.1929), *Caenonympha glycerion glycerion* Borkhausen, 1788 (sin. *C. iphis* Denis & Schiffermüller, 1775, (2.VIII.1899), near threatened.

The high level of diversity of Lepidoptera fauna [4,16, 36] in Europa and of Romania is reflected not only by different published studies, but also by the collections kept in the Natural History Museum in Sibiu of Romania. Beside common species, the collection of Lepidoptera preserved in Natural History Museum also contains rare and endemic species for Romanian fauna. These taxa are very important from scientific and biogeographical point of view [1].

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