

MANAGEMENT ECOSYSTEM IN DUMBRAVA SIBIULUI FOREST ON THE EVOLUTION OF SPECIES MACROLEPIDOPTERA SIBIU DURING THE YEARS 2000-2012

Cristina STANCĂ-MOISE¹

“Lucian Blaga” University of Sibiu, Faculty of Faculty of Agricultural Sciences, Food Industry and Environmental Protection, Sibiu, Romania, Phone: 0040269234111, Fax: 0040269234111, e-mail: cristinamoise1@yahoo.com

Corresponding author: cristinamoise1@yahoo.com

Abstract

It was studied the ecology and phenology, the flight periods of the Macrolepidoptera during the period 2000-2012 in the Natural Park „Dumbrava Sibiului”. The natural conditions and the specific features were mentioned in my previous papers (Stancă-Moise, 2000, 2002, 2003, 2004, 2007, 2010, 2011, 2012). There is no doubt that the appearance of the different species of Macrolepidoptera in different periods of time is in a direct relation with the succession of the climatic conditions. The flight periods express the biological specific feature of each species of Lepidoptera, being in direct connection with the activity of feeding and reproduction of imagos.

Key words : *Macrolepidoptera, “Dumbrava Sibiului” Forest, factors, ecosystem, biodiversity.*

INTRODUCTION

“Dumbrava Sibiului” Forest ecosystem consists of a community of living organisms to their environment, the interaction and interdependence between them. Currently little is known role played by biodiversity on the functioning of this ecosystem [1, 2].

It is also difficult to say what role each component lies in preservation of this ecosystem, what role species a Macrolepidoptera out numbered against other species of insect dominant character.

This theme aims knowledge of the biological resources. The study of macrolepidoptera species inventory and host plants relative to the protection of this ecosystem man- treating problem important in Sibiu. Study and the data they provide are not another problem has been resolved only in part will not cercatările stop here but will continue in the future. Microlepidoptera species we still being studied and inventoried, but participating with other insect species in this system is complex ecosystem “Dumbrava Sibiului” Forest.

Following the International Convention in Rio de Janeiro, Brazil in 1992, where he and Romania joined the focus on biodiversity

conservation species plants and animals. Since 1998 began a study biodiversity through inventory plant species subject to human aggression and the measures necessary for their preservation. In 1999, the research fauna inventory covers the territory of Romania, subject to bullying anthropogenic or other factors, and measures must be taken to its preservation [3].

Biodiversity is a multifaceted concept and interpretation of data analysis may give rise to discussions or debates. Biodiversity in the “Dumbrava Sibiului” Forest is a broad concept, the effects of scientific, social and economic implications of daily life Say the local community.

Some species of Macrolepidoptera reported in the study area have a high importance to science and agricultural practice, it is known that butterflies are pollinating insects.

Human activities, tourism, urbanization, are occupations that are practiced “Dumbrava Sibiului” Forest ecosystem within which often have aggressive action on it and the population of the Macrolepidoptera. The analyzes performed over time was found to reduce the number reported species, migration

or disappearance that had some role in the balance this ecosystem [4,5].

MATERIALS AND METHODS

During the research work running on a material of 1596 samples, there were identified 243 species of Macrolepidoptera, belonging to 162 Genera and 17 Families [12].

The length of the periods when the active imagos of different species of Macrolepidoptera could be found, is fluctuating in limits rather large established by specific features of the biological cycle of development (monovoltine, bivoltine, trivoltine, Table 1) correspondingly to climate conditions, first of all, to the temperature.

Table 1. Number of identified species by type

MONOVOLTINE	BIVOLTINE	TRIVOLTINE
149 species	84 species	10 species

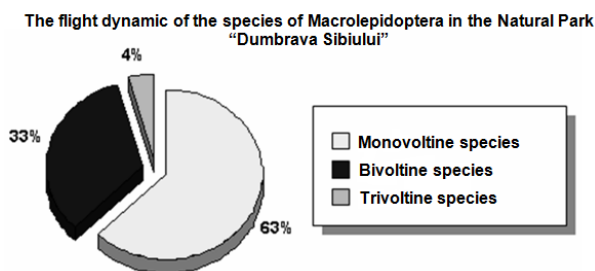


Fig.1. The flight Dynamics of the species of Macrolepidoptera in the Natural Park "Dumbrava Sibiului"

In the systematic table (Stancă-Moise, 2003) there are mentioned all the data obtained by studying the biological material from the collecting field activity and also data about flight periods.

These data were completed (supplemented) with information from the consulted bibliography by some species [6,7,8].

Some data are valid only for the studied area, and in connection with specific environmental conditions.

The personal data could be not considered definitive, specially for species which I registered too little phenological observations[13].

Table 2. The flight period of the Macrolepidoptera families from Natural Park „Dumbrava Sibiului”

FAMILY	MONTH										
	1	2	3	4	5	6	7	8	9	10	11
I. LASIOCAMPIDAE											
II. LEMONIDAE											
III. SATURNIDAE											
IV. DREPANIDAE											
V. THYATIRIDAE											
VI. GEOMETRIDAE											
VII. SPHINGIDAE											
VIII. NOTODONTIDAE											
IX. LYMANTRIDAE											
X. ARCTIIDAE											
XI. CHENUCHIDAE											
XII. NOCTUIDAE											
XIII. HESPERIIDAE											
XIV. PAPHIONIDAE											
XV. PIERIDAE											
XVI. NYMPHALIDAE											
XVII. SATYRIDAE											
XVIII. LYCENIDAE											

RESULTS AND DISCUSSIONS

Concerning the general dynamics of the flight period, I can consider that the majority of the species of Macrolepidoptera are active in the months June-July, because of the great number of species collected during this period [9,10,11].

The studied material was collected during the flight periods mentioned in the Tab. 2. It could be observed that they are families with a short flight period of only 2 months like the species of families LEMONIDAE, other families have the flight period of 4-6 months, like the species of the majority of the studied families. The majority of species (Tab. 2, fig. 1) have the flight period in April-August. In the situations when species have more generations during one year, it is possible to be two or three generations a the same species, during one year, for example at the Fam. LYCAENIDAE (*Lycaena phlaes* L., 1758, *Arcinia agestis agestis* Den.& Schiff., 1775; Fam SATYRIDAE (*Caenonympha pamphilus* L., 1758), Fam NYMPHALIDAE (*Clossiana dia dia* L., 1767, *Issoria lathonia* L., 1758); Fam PIERIDAE (*Pieris brassicae brassicae* L., 1758; *Pieris rapae rapae* L., 1851). In the studied area only 84 species have two generatious in one year and only in

the favourable meteorological conditions. About the general dynamics of the flight period, we can see that the majority of the studied species are active during the period April-May and June-August.

The species *Archiearis puella* sensu L'homme Fam. GEOMETRIDAE on 2.III.2001 could be considered the earliest species and *Operophtera brumata* L., 1758 Fam. LARENTIINAE was collected by W. Weindel on 2.XII. 1956 in 17 samples in the Park „Dumbrava Sibiului”

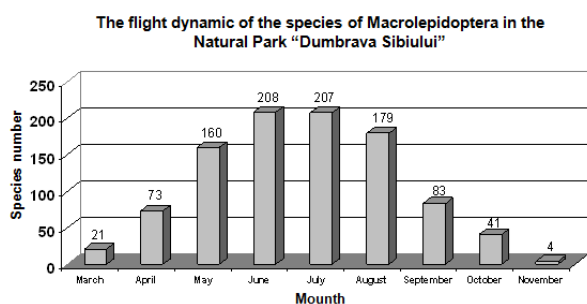


Fig.2. The flight Dynamics of the species of Macrolepidoptera in the Natural Park "Dumbrava Sibiului" by month

On the whole, the periods when maximum of species are flying is June (208) followed by July (207), then August (179), May (160), September (83), April (73), October (41), March (21) and November (4).

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CONCLUSIONS

The current appearance of the Dumbrava Sibiului is mostly the result of human action which has occurred over time through: cutting, drainage, replanări and systematization.

Among the most severe human interventions in the late nineteenth and twenty-first century include:

- commissioning of Sibiu - Rasinari tram line that runs across the entire length forest north-east and south-west;
- upgrading of access roads to village inari (parallel to the tram line) and into Cisnădioara common, as they are both high traffic roadways to travel and recreational areas;
- Construction and commissioning of textile enterprises located in the central part of the forest on the left bank of Valea Aurie;
- construction of a tourist complex with zoo, motel, camping inn in the NE near Sibiu;
- establishment of an open-air ethnographic museum with an area of 100 hectares, located near the tourist complex ;
- construction of a residential area behind the Hilton Hotel;
- clearing a lane NS direction for high voltage line;
- placing military objectives;
- Creating three recreational lakes and the river located in the Valea Aurie, Ethnographic Museum and Zoo.

In all the above may be added the influence of grazing, due to proximity to and regular crossing flocks of forest villages and Poblaca Rasinari.

Parallel to these negative influences, in some cases, were conducted and protective actions initiated mainly by foresters. Such measures have been taken to prevent grazing in the forest and avoiding unplanned cutting through fencing and perimeter arrangement of grooves that prevent access. The perimeters were established with the role of seed reserves, were performed cleaning and replanting [14].

As a conclusion to the above it can be stated that the territory is strongly Dumbrava Sibiului, especially the U.S. which is in the vicinity of Sibiu. This negatively influenced the life and work Mcrolepidopters by the disappearance of the favorite habitats host plants. Therefore, over the years some species have not been reported, others are very rare or even extinct long. The warning signs drawn by naturalists and various tourism and environmental organizations and not least by the protectors of the forest, foresters were decided by the Council of Sibiu County Resolution No. 12 of 28 September 1994, the

Dumbrava Sibiului- Natural Park Sibiu to be declared under the Forest administrative shortcomings in Sibiu, judgment is necessary to have a more authentic to avoid the extinction of this wonderful corner of nature Sibiu nine worthies left our ancestors.

REFERENCES

- [1]Ciochia, V., Stancă-Moise Cristina, 2000, Contribuții la studiul structurii și activității entomofaunei epigeice într-o pădure de stejar Dumbrava Sibiului, Lucr. celei de a 5-a Conf. Naț. ptr. Prot. Med. prin Met. și Mij. Biol. și Bioteh. și a Celei de a 2-a Conf. Naț. de Ecosan. 26-27 Mai, Brașov, p:320-328
- [2]Ciochia, V., Stancă-Moise Cristina, 2001, Contributions to the knowledge of the Macrolepidoptera from natural complex "Dumbrava Sibiului", Analele Universității "Al. I. Cuza" Iași, p:125-131
- [3]Davidescu, D., 2002, Conservarea biodiversității speciilor vegetale și animale, Editura Academiei Române, București
- [4]Rákosy, L., Goia, M., Kovacs, L., 2003, Catalogul lepidopterelor României. Societatea Lepidopterologică Română Cluj-Napoca
- [5]Rákosy L., 2003, Lista roșie pentru fluturii diurni din România (Rote Liste der Tagfalter Rumäniens) Bul. inf. Soc. lepid. rom. 13(1-4):7-18
- [6] Stancă-Moise Cristina, 2002, Contribuții la studiul structurii și activității Macrolepidopterelor din Complexul natural Dumbrava sibiului și reflectarea presiunii antropice asupra acestora", Universitatea București, Facultatea de Biologie, teză de doctorat (258 p)
- [7] Stancă-Moise Cristina, 2003, Structura și dinamica Macrolepidopterelor din Complexul Natural Dumbrava Sibiului, Lucrările celei de a 6-a Conf. Naț. ptr. Prot. Med. prin Met. și Mij. Biolog. și Bioteh. și a Celei de a 3-a Conf. Naț. de Ecosanogeneza, Brașov, p: 293-301
- [8]Stancă-Moise Cristina, 2003, Influența factorilor antropici asupra evoluției Macrolepidopterelor din Pădurea Dumbrava Sibiului, Lucrările celei de a 6-a Conf. Naț. ptr. Prot. Med. prin Met. și Mij. Biolog. și Bioteh. și a Celei de a 3-a Conf. Naț. de Ecosan. 31 Mai 2003, Brașov, p: 309-311
- [9]Stancă-Moise Cristina, 2004, Importanța Macrolepidopterelor în cadrul ecosistemului pădurii de stejar „Dumbrava Sibiului”, Oltenia. Studii și Comunicări Științele Naturii, Editura Sitech Craiova, p: 219-222
- [10]Stancă-Moise Cristina, 2007, Biodiversitatea faunei de Macrolepidoptere (Insecta, Lepidoptera), din ecosistemul Pădurii "Dumbrava Sibiului" în perioada anilor 2001-2006, Lucrarile celei de a 8 Conferință Națională pentru Protecția Mediului prin Biotehнологii și a 5-a Conferință Națională de Ecosanogeneză, p:64-66

[11]Stancă-Moise, Cristina, Tănase Maria, 2010, Method of analysis for population limitation of the Lepidoptera pest in fruiters (Lepidoptera, Insects) in Sibiel village, own orchard, conditions of year 2009, Acta Universitatis Cibiniensis, Seria Științe Agricole, vol. 1, nr. 1(1)/2010, Editura Univ. „Lucian Blaga” din Sibiu, 97-102

[12]Stancă-Moise Cristina, 2011, The protected species of Lepidoptera in the oak forest "Dumbrava Sibiului", Romania, Buletin USAMV Agriculture, 68(1)/:216-223

[13]Stanca Moise Cristina, 2012, Macrolepidopterele din Dumbrava Sibiului, Editura Universitatii Lucian Blaga din Sibiu, p:271

[14]Székely L., 2003, Istoricul cercetărilor lepidopterologice din sud-estul Transilvaniei, Lucrările celei de a 6-a Conferințe Naționale pentru Protecția Mediului prin Metode și Mijloace Biologice și Biotehnice și a celei de a 3-a Conferințe Naționale de Ecosanogeneză. 31 Mai. Brașov. 318-322