Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development
Vol. 16, Issue 4, 2016
PRINT ISSN 2284-7995, E-ISSN 2285-3952

NOCTURNAL LEPIDOPTERA CAPTURED DURING 2013-2015 IN THE SPECIFIC AREA SIBIEL-SIBIU (ROMANIA)

Cristina STANCĂ-MOISE

"Lucian Blaga" University of Sibiu, 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

The paper presents the abundance of species of nocturnal Lepidoptera that favorable environmental conditions may constitute a danger to crops near the pasture analyzed. Capturing harmful insects by using trap light years in the period 2013-2015, contributes to protecting the environment and thus eliminate the use of pesticides in soil persistence that can be used to combat pests of crops, and to establish optimal combat moments when treatment it is justified economically.

***Key words*:** *Lepidoptera, capturing, environment, Sibiel-Sibiu, Romania*

INTRODUCTION

Anticipating the time of appearance and multiplication of pests, it is necessary to assess the composition of the cohabitant structure a meadow ecosystems biodiversity of crops in the vicinity of the village of Sibiel located 22 km from Sibiu.

Sibiel village is recognized as an old tourism settelment in Sibiu Surroundings situated 22 km from Sibiu [1]. The whole village Sibiel belongs the Cibin basin in form of a triangle pointing Bărcu Roșu Hill 1400 m alt. It is bordered in the south and southeast of Orlățelului springs, creeks which flow gather on the left side that spring from them Cacova forests and then discharged into the river Orlat a total length of 15 km. In the west, NV triangle bounded by the river right branch of Sibiel river whose headwaters are and where the Red Bărcu reap streams: Scoroşet, Săroaia Fortress Valley, Uţii Valley.

MATERIALS AND METHODS

This method consisted of installing the light trap in one place in a meadow those of 3000 m^2 in the village of Sibiel [6,11,15,33,36,], could draw such conclusions on the insect population density variation with nocturnal flight. To determine the structure, abundance, species Lepidoptera [30-39] numerical fluctuation night, valuations were performed by using trap light collection.

During operation trap light between the years 2013-2015, at regular intervals, were recorded number of seizures, results, observations and interpretation curve flight dominant species collected. After the curve flight Lepidoptera in relation to the biology of species, frequency of rises catches, the traps have provided data on the appropriateness of applying the treatments to combat grassland crops from neighboring areas analyzed [12,13,15,40,45].

It watched inventory pest, establishing distribution area, highlighting the activity is flying and sometime in the life cycle, the alert warning time for establishing optimum periods of combat.

Photo 1. Meadows of 3000 m^2 in the village of

Sibiel (Original Photo)

Comparing data on flight dynamics between different generations of a pest species in one year, and the flight curves set in different years, are elements of guidance on pest populations increase and decrease [24-26].

RESULTS AND DISCUSSIONS

In the three years of observations were collected specimens grouped in seven families (Table 1).

Climate conditions specific to each year have influenced the number of species collected. The low number of Lepidoptera copies since 2013-1093 due to large amounts of rainfall 497 mm-450 mm and low average temperatures 14-15.5°C. In 2014, year of low rainfall 147.5 mm and average temperature 15.6°C, observed in capturing the highest abundance for customized Lepidoptera-7,441 individuals.

Table 1. Family of nocturnal Lepidoptera capturing in the period 2013-2015

No. crt.	Family	Number of species	Number of samples	%
1	**NOCTUIDAE**	21	5651	75.6%
2	**GEOMETRIDAE**	8	624	17.3%
3.	**ARCTIIDAE**	5	985	11%
4.	**SPHINGIDAE**	3	67	0.7%
5.	**NOTONTIDAE**	2	57	0.8%
6.	**LASIOCAMBIDAE**	2	23	0.3%
7.	**PYRALIDAE**	1	34	0.4%

Photo 2. *Xestia c. nigrum*

Lepidoptera species dominated the Fam. Noctuidae: *Xestia c. Nigrum* (Photo 2), 944 copies of which 231 copies, 28.1% (2013), 264 specimens, 23% (2015). *Agroti segetum* (Photo 3), - 354 samples of which were 147 copies collected in 2015.

Photo 3. *Agroti segetum*

Subfamily Plusiinae: *Autographa gamma (Photo 5)*, - 672 copies, flying upward in June to 36 copies-17.9% (2014) 45 copies-3.1% in August (2015).

Subfamily Amphiperinae: *Oligia strigilis* (Photo 4), - 268 copies of which 127 copies were seized in 2013.

From table 1 it is observed a large number of lepidopteran belonging to the Fam. Actiidae-11.0% in 985 copies, with 354 copies flight in July-August to 12.8% and 276 copies- 11.2%.

Photo 4**.** *Oligia strigilis*

Dominated species: *Phragmatobia fuliginosa* (Photo 6), 132 copies-4.8%, *Spilosoma lutea* (Photo 7), 124 copies, 4.3%.

Photo 5. *Autographa gamma*

Photo 6. *Phragmatobia fuliginosa*

Photo 7. *Spilosoma lutea*

Collecting fauna by this method is representative of Lepidoptera [2-10, 16-29, 40-42] species and for other groups of insects, beetles (*Carabidae, Coccinelidae, Elateridae*), contributing to improving knowledge of entomofauna useful in the study area[14,43-47].

Most species of flying upward in August, the month with average temperatures of 16.5% and low rainfall, species *Xestia c. nigrum* had two generations better distinct a flight without interruption in July, 208 copies peak for the year in August-286 copies (2013-2015). *Oligia strigilis*, one generation in June with a maximum of 120 copies-catching 44.2% in 2013. Depending on weather conditions, constant activity showed the following species.

CONCLUSIONS

The abundance of species in seizures showed Fam. Noctuidae (Table 2): *Xestia c. nigrum*-218 copies, 29.8% in 2013, 122 copies-24% in 2014, 154 copies -17.8% in 2015.
Autographa gamma: 144 copies in June, with a total of over 342 copies between 2013-2015
Agrotis segetum: total 138 copies: 114 copies, 34% in 2013 and fewer, 122 copies in 2015.
Climatic factors characteristics of each I have fluctuations in the number of species affected. Flight upward for most butterfly seen in June and August when average temperatures were 16.9^{o}C and low rainfall.
The presented method helps knowledge of the fauna in the area Sibiel Sibiu, lepidopteran species but also those of Diptera and Coleoptera. After the captured abundance crop treatments were carried out in the area.

Table 2. The abundance of species in seizures showed Fam. Noctuidae

No.crt.	Species	Month	2013	2014	2015	Total
1.	*Xestia c. nigrum*	July	95	37	76	208
		August	123	85	78	286
2.	*Agrotis segetum*	June	18	6	43	67
		August	23	13	35	71
3.	*Autographa gamma*	June	15	82	47	144
		July	47	11	43	101
		August	52	13	32	97
4.	*Oligia strigilis*	May	32	7	73	112
		June	24	2	94	120
TOTAL			**429**	**256**	**521**	**1206**

REFERENCES

[1]Bucșa, C., 2011, Municipiul Sibiu şi zona periurbană. Repere ecologice. Editura Universității " Lucian Blaga" Sibiu, 220 pp.
[2]Ciochia, V., Stancă-Moise, C., 2002, Contributions to the knowledge of the Macrolepidoptera from Natural Complex "Dumbrava Sibiului". Scientific session dedicated to celebrating 75 years since the

establishment of Marine Biological Station "Prof. Dr. Ioan Borcea" Agigea-Constanta. 19-20 october 2001. Analele Ştiinţifice ale Universitaţăţii „Al.I.Cuza" Iaşi. s. Biologie Animală, Tom XLVIII: 29-43.

[3]Moise, C., 2011, Macrolepidoptera (Insecta: Lepidoptera) indicator of climate changes. Buletin USAMV Agriculture, 68(1): 420 pp.

[4]Moise, C., 2011, Lepidoptera (Insecta: Lepidoptera) in the Collection of Daniel Czekelius from Natural History Museum of Sibiu collected from "Dumbrava Sibiului" Forest, Romania. Analele Universitatii din Oradea, Fascicula Biologie, 18(2):104-110.

[5]Moise, C., 2011, Study on contributions to the knowledge of the fauna siebenbürger saxons of lepidoptera in siebenbürger and around Sibiu, entomology collections of the Museum of Natural History in Sibiu". 18th International Economic Conference -Iecs 2011, Sibiu, 179-187.

[6]Moise, C., 2011, Lepidoptera (Insecta: Lepidoptera) in the Collection of Eugen Worell from Natural History Museum of Sibiu, collected from "Dumbrava Sibiului" forest. Lucrari stiintifice, seria Horticultura, "Ion Ionescu de la Brad". Iaşi, 54(2): 571-576.

[7]Moise, C., 2011, Study on the Macrolepidoptera Collected from the Dumbrava Sibiului forest existing within the Collection of Dr. Viktor Weindel. Muzeul Olteniei Craiova, Studii şi comunicări, Ştiinţele Naturii, 27(2): 96-104.

[8]Moise, C., 2011, Impact of climate factors and anthropogenic on Macrolepidoptera activity of the Forest Dumbrava Sibiu, Romania. Proceedings of the 7th International Conference. Integrated Systems for Agri-Food Production. SIPA 11, November 10-12, 2011, Nyiregyhaza Hungary, 95-99.

[9]Moise, C., Sand, C., 2012, Research on Macrolepidoptera species (Insecta:Lepidoptera) collected in Dumbrava Sibiului Forest (Romania) in conditions of the year 2011 and their status line in IUCN 2001 system, Analele Universitatii din Oradea, Fascicula Biologie, 19(1): 55-66.

[10]Moise, C, 2014, The butterflies Red List (Insecta: Lepidoptera) collected from Dumbrava Sibiului forest (Romania) during 2001-2012, Analele Universităţii din Oradea, Fascicula Biologie, 21(1): 39-44.

[11]Moise, G., 2011, Obtaining mechanical force using gas pressure generated by microorganism in a self-presurized membrane bioreactor, Proceedings of the 7th International Conference, Integrated Systems for Agri-Food Production, SIPA'11, November 10-12, 2011, Nyiregyhaza, Hungary, ISBN 978-606-569-312-8, p:227-229.

[12] Moise, G., 2014, Electrochemical methods determination of heavy metals in wine beverage achieving ecosanogene, Scientific papers series Management, Economic Engineering in Agriculture and Rural Development, ISSN 2285-3952, p:191-193.

[13]Moise, G., 2014, Promotion of ecologic product certification as instrument to speed up the ecologic agriculture. Scientific Papers Series "Management, Economic Engineering in Agriculture and Rural Development", Vol. 14(1): 241-244.

[14]Moise, G., 2015, Research on quality analysis of an assortment of five types of honey in Romania, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development, Vol. 15(3):195-199.

[15]Moise, G., 2016, Passive irrigation system for green roofs. Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development, Vol. 16(1): 331-334.

[16]Stancă-Moise, C., 2002, The entomologists from Sibiu their contribution to the knowledge of the Lepidopterofauna of Sibiu-Surroundings collections. Lepidoptera. Macrolepidoptera. Analele Stiintifice ale Universitatii "Al. I. Cuza" Iasi. Sectiunea I Biologie Animala, TOM XLVIII: 7-12.

[17]Stancă-Moise, C., 2003, Structura şi dinamica Macrolepidopterelor din Complexul Natural Dumbrava Sibiului. pp: 293-301. In: Proceedings of 6th National Conference on Environmental Protection in Biological and Biotechnical Methods and Means and the 3rd National Conference Ecosanogenese, (in romanian) 31 of May 2003, Braşov.

[18]Stancă-Moise, C., 2003, Propunere în vederea realizării listei roşii a Macrolepidopterelor din Complexul Natural Dumbrava Sibiului. pp: 301-309. In: Proceedings of 6th National Conference on Environmental Protection in Biological and Biotechnical Methods and Means and the 3rd National Conference Ecosanogenese, (in Romanian) 31 of May 2003. Braşov.

[19] Stancă-Moise, C., 2003, The biodiversity of the species of macrolepidoptera from Sibiel zone (Sibiu county) in 2003 summer. Muzeul Olteniei Craiova. In:Studii si comunicări. Şiinţele Naturii. 20(1):214-218.

[20]Stancă-Moise, C., 2004, Importanţa Macrolepidopterelor în cadrul ecosistemului Pădurii de stejar „Dumbrava Sibiului". Oltenia. Studii şi Comunicări Ştiinţela Naturii, Press Sitech Craiova, 20: 190-222.

[21]Stancă-Moise, C., 2005, Date privind speciile de Macrolepidoptere pereclitate semnalate în Pădurea „Dumbrava Sibiului" şi problema ocrotirii acestora. Proceedings of 7th National Conference on Biotechnology and Environmental Protection by 4-Ecosanogenese National Conference, (in Romanian), 27-28 of May 2005, Braşov, 2: 827-834.

[22]Stancă-Moise, C., 2005, The phenology of the Macrolepidoptera (Lepidoptera: Insecta) from the natural Park „Dumbrava Sibiului". pp: 565-568. In: Jubilee Conference with international participation "Science. Processes and Technologies Agro-Food (in romanian) 12-13 May 2005, Sibiu.

[23]Stancă-Moise, C., 2005, Ecological study about the evolution of the species *Papilio machaon machaon* L., 1758 (Lepidoptera, papilionidae) in ecosystem of the oak forest „Dumbrava Sibiului" and the importance of its protection. pp: 569-572. In: Jubilee Conference with international participation "Science. Processes and Technologies Agro-Food.(in Romanian). 12-13 May, 2005, Sibiu.

[24]Stancă-Moise, C., 2005, A preliminary study on

ecological diversity of the Lepidopterofauna in the Natural Reservation „Dumbrava Sibiului" by means of the specific indexes. Biotehnologie şi Biodiversitate, Agroprint Press, Timişoara, pp: 165-169.
[25]Stancă-Moise C., 2005, Dinamica zborului la Macrolepidoptere (Insecta, Lepidoptera) din pădurea „Dumbrava Sibiului" în perioada 2001-2004, Fam. Nymphalidae. Muzeul Olteniei. Craiova. Oltenia Studii şi Comunicări Ştiinţele Naturii, 21: 87-97.
[26]Stancă-Moise, C., 2005, Studiu ecologic privind diversitatea lepidopterelor din Pădurea „Dumbrava Sibiului" cu ajutorul indicilor specifici. Proceedings of 7th National Conference on Biotechnology and Environmental Protection by 4-Ecosanogenese National Conference with international participation. ín romanian", 27-28 of May 2005, Braşov, 2: 835-836.
[27]Stancă-Moise, C., 2006, Date privind prezenta papilionidelor (Insecta: Lepidoptera: Papilionidae) in fauna Padurii Dumbrava Sibiului in perioada 2001-2005. Muzeul Olteniei, Craiova, Oltenia Studii şi Comunicări Ştiinţele Naturii, 22: 203-206.
[28]Stancă-Moise, C., 2006, A preliminary study on ecological diversity of the Lepidopterofauna in the Natural Reservation „Dumbrava Sibiului" by means of the specific indexes, Biotehnologie şi Biodiversitate. Press Agroprint Timişoara, pp: 165-169.
[29]Stancă-Moise, C., 2007, Biodiversitatea faunei de Macrolepidoptere (Insecta, Lepidoptera), din ecosistemul Pădurii "Dumbrava Sibiului" în perioada anilor 2001-2006. pp: 64-66. In: The works of the 8th National Conference for Biotechnology and Environmental Protection by 5-Ecosanogenese National Conference (in Romanian), 26-27 of May 2007.
[30]Stancă-Moise C., 2007, Noi contribuţii la cunoaşterea Macrolepidopterelor din complexul forestier "Dumbrava Sibiului", pp: 59-63. In: The works of the 8th National Conference for Biotechnology and Environmental Protection by 5-Ecosanogenese National Conference (in romanian), 26-27 of May 2007.
[31]Stancă-Moise, C., 2007, The specific index in wiew of ecological diversity analisys of the lepidopterophauna populations in the natural Reservation „Dumbrava Sibiului". pp. 439-442. In: Proceeding of the Internationl Conerence „Agricultural anf Food Sciences, Process and Technologies" with theme „Agriculture and food Industry within the Context of European Integration", April 26-28, 2007.
[32]Stancă-Moise C., 2012, Macrolepidopterele din Pădurea Dumbrava Sibiului, Editura Universităţii "Lucian Blaga" din Sibiu, 271 p.
[33] Stancă-Moise, C., 2014, Method of analysis for population limitation of the Lepidoptera pest in fruiters (Lepidoptera: Tortricidae) in Sibiel village, Sibiu city in conditions of year 2013, Management , economic engineering in agriculture and rural development. 14(1):333-336.
[34]Stancă-Moise, C., 2015, Information on the Macrolepidoptera fauna of "Dumbrava Sibiului" oak forest (Sibiu, Romania), The Annals of Oradea University. Biology fascicle, 22(1): 33-46.
[35]Stancă-Moise, C., 2015, Lepidoptera colleted from Dumbrava Sibiu forest, preserved in collections of Museum of Natural History in Sibiu. The Annals of Oradea University. Biology fascicle, Vol. 22(2):81-95.
[36]Stancă-Moise, C., 2015, Observation on the biology of species *Cydia pomenella* (worm apple) in an orchard in the town Sibiel, Sibiu county in 2014. Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development. 15(3):293-296.
[37]Stancă-Moise, C., 2015, Family Pieride (Lepidoptera, Pieridae) and evolution over time in forest grove Sibiu (Sibiu, Romania) Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development. 15(1): 307-311.
[38]Stancă-Moise, C., 2016, Migratory species of butterflies in the surroundings of Sibiu (Romania). Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development. 16(1): 319-324.
[39]Stancă-Moise, C., 2016, Behaviour and dynamics of mamestra brassicae species (Lepidoptera: Noctuidae) in an agricultural ecosystem in the town Sibiel, county in regim of the years 2014-2015. Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development. 16(1): 325-329.
[40]Székely, L., 2004, Noutăţi Lepidopterologice din sud-estul Transilvaniei. In: Buletin Informare Entomologică 14-15, Cluj-Napoca (2003-2004), p. 41-56.
[41]Székely, L., 2008, Szèkely Levente, The Butterflies of Romania – Fluturii de zi din România. In: Brastar Print. Braşov 262 p.
[42]Székely, L., 2014, Istoria Lepidopterologiei din România. In: Brastar Print. Braşov 297 p.
[43]Tănase, M., Antonie, I., Stanca-Moise, C., 2015, Protectia plantelor, Editura Universitatii Lucian Blaga din Sibiu
[44]Tănase, M., 2014, Cuscuta studiu monografic, Ed. Universităţii "Lucian Blaga" Sibiu, 227 pp.
[45]Tănase, M., 2005, Aspecte privind importanţa economică a cuscutei - BIOTASAS 2005 – A 7-a Conferinţă Naţională de Protecţia Mediului prin Biotehnologii şi A 4-a CConferinţă Naţională de Ecosanogeneză, Editura PELECANUS Braşov
[46]Tănase, M., 2005, Observaţii privind unele aspecte ale fotosintezei la cuscută, BIOTASAS 2005 – A 7-a Conferinţă Naţională de Protecţia Mediului prin Biotehnologii şi A 4-a CConferinţă Naţională de Ecosanogeneză, Editura PELECANUS Braşov
[47]Tănase, M., 2003, Fitopatologie, Editura Universităţii "Lucian Blaga" Sibiu