RESEARCH ON EARTHWORM BIODIVERSITY (*OLIGOCHAETA-LUMBRICIDAE*) IN DECIDUOUS FOREST SOILS UNDER THE ECOLOGICAL CONDITIONS IN THE YEAR 2011

CERCETĂRI PRIVIND BIODIVERSITATEA SPECIILOR DE LUMBRICIDE (*OLIGOCHAETA- LUMBRICIDAE*) DIN SOLURILE PĂDURILOR DE FOIOASE, ÎN CONDIȚIILE ECOLOGICE ALE ANULUI 2011

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Abstract. *Knowing the species of animals that compose a given area requires fauna of observations extending over many years. In the previous year (2010) I started the investigation of earthworm soil fauna in deciduous forests in the Eastern Carpathians. Observations and analyses have continued in 2011 and will continue, the target being to accurately determine the earthworms species that inhabits these soils, tracing the dynamics of population of each particular species and species evolution, referencing the evolvement of environmental factors and specific food source, represented by organic material provided by deciduous species that make up the dominant vegetation. Associations include deciduous up to 10 species, dominant being Fagus sylvatica; Fraxinus excelsior and Carpinus betulus. As regards the structure of the earthworms species identified, it includes 9 species, 6 species existing in the previous year and 3 species identified for the first time in such research.*
Key words: earthworm, biodiversity, dynamic of population, fauna, organic material

Rezumat. *Cunoaşterea speciilor animale care compun fauna unui areal dat necesită observații care se întind pe mai mulția ani. În anul anterior (2010) am demarat investigarea faunei de lumbricide din solul unei păduri de foioase aflată în Carpații orientali, în județul Suceava. Observațiile şi analizele au continuat şi în anul 2011 şi vor continua în următorii ani, ținta acestora fiind stabilirea exactă a speciilor de lumbricide care populează solurile respective, urmărirea dinamicii populaționale a fiecărei specii şi corelarea evoluției particulare a speciilor cu evoluția factorilor de mediu dar şi cu specificul sursei de hrană, reprezentată prin material organic furnizat de speciile de foioase care compun predominant vegetația. Asociațiile de foioase cercetate cuprind până la 10 specii, dominante fiind: fagul- Fagus sylvatica; frasinul- Fraxinus excelsior şi carpenul- Carpinus betulus. În ce priveşte structura speciilor de lumbricide identificate, ea cuprinde în anul 2011 – 9 specii, 6 existente şi în anul anterior şi 3 specii identificate pentru prima data în aceste cercetări.*
Cuvinte cheie*:* lumbricide, biodiversitate, dinamica populatiei, fauna, materie organică

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INTRODUCTION

Earthworms (*Oligochaeta*, *Lumbricidae*) are true soil engineers, their presence are many positive effects. Abundance and large number of individuals in soil, indicate that soil is rich in humic substances.

For safety information, observations and determinations are made for many years.

MATERIAL AND METHOD

Observations and taking biological samples were made on the forest area Râşca, Suceava, in a forest with local associations of 8-12 species, dominant species are beech (*Fagus sylvatica* L.), ash (*Fraxinus excelsior* L.) and hornbeam (*Carpinus betulus* L.).

Average yearly temperature in region is 8.8°C, with high variations in the summer and the amount of annual rainfall exceeds 600 l / m.

For biological sampling were established in the previous year (2010) 4 sites (denoted L1, L2, L3 and L4), spaced in a circular area of 1 km diameter, are preferred over surfaces with mixed species of trees and surface soil covered with dense herbaceous vegetation. Each biological sampling spot was a circle with a radius of 5 m and from each location was taken at five soil samples (about center and four directions, opposite two by two).

Sampling of biological material was carried out twice a month, from April until October 2011. Soil taken from the 20 holes was sifted and collected biological material was sorted and recorded, then determined. Living individuals (adults and juveniles) were killed on the spot, for better conservation, then brought to the laboratory and determined (Pop, 1949).

Cocoons were only counted and registered. To determine the species and to estimate the number of individuals of each species were used only adult individuals, they are the only species that determination can be done correctly.

Taxonomic identification was performed by morphological and anatomical laboratory studies. The classification system used is that proposed by Pop, 2005, 2006 with some modifications.

RESULTS AND DISCUSSIONS

The area studied in 2011 was reported 15 species of earthworms (*Oligochaeta, Lumbricidae*), namely: *Allolobophora caliginosa* Sav, *Allolobophora rosea* Sav, *Allolobophora dugesi* Pop, *Dendrobaena octaedra* var. *typica* Sav, *Dendrobaena alpina var. Typica* Sav. *Lumbricus terrestris* L., *Eisenia fetida* Sav, *Eisenia submontana* Vejd., *Eisenia lucens* L., *Dendrobaena rubida* Rosa, *Octolassium lissaense* Mich., *Octolassium lacteum* Orley, *Eiseniella tetraedra typica* Sav., *Lumbricus rubellus* Hoff., *Lumbricus castaneus* Sav. (table 1).

As can be seen from the table above, of the 15 species reported in the area studied, 9 species are present everywhere, in all locations (60%), a species is present in three locations (6, 66%), two species are present in two locations (13, 33%) and 3 species are present in one location (20%).

Thus 9 of the 15 species were found in all samples one non all sites surveyed, thus having a frequency of 100%. These species are *Allolobophora*

caliginosa Sav., *Allolobophora rosea* Sav., *Allolobophora dugesi var. Dacica* Pop, *Dendrobaena octaedra var. Typica* Sav., *Eisenia fetida* Sav., *Eisenia submontana* Vejd., *Lumbricus terrestris* Sav., *Lumbricus rubellus* Hoff., *Octolassium lacteum* Orley.

Table 1

Earthworm species collected in 2011

Nr. crt	Species	No. individuals collected	Feature
1	*Allolobophora caliginosa* Sav.	56	Common
2	*Allolobophora rosea* Sav.	44	Common in soil
3	*Allolobophora dugesi var. Dacica* Pop	12	Common in soil
4	*Dendrobaena octaedra var. Typica* Sav.	31	Common in soil
5	*Dendrobaena alpina var. Typica* Sav.	2	Common in soil
6	*Dendrobaena rubida*(Rosa)	45	Common In garbage
7	*Eisenia fetida* Sav.	103	Common In garbage
8	*Eisenia submontana* Vejd.	62	Common in soil
9	*Eisenia lucens* L.	5	Rare
10	*Eiseniella tetraedra typica* Sav.	27	amphibious
11	*Lumbricus terrestris* Sav.	47	Common in soil
12	*Lumbricus rubellus* Hoff.	116	Common in soil
13	*Lumbricus castaneus* Sav.	6	Common in soil
14	*Octolassium lissaense* Mich.	28	Common in soil
15	*Octolassium lacteum* Orley	96	Common in soil

In terms of dominance, following investigations we found that: - Of the 15 species collected three species are eudominant species (*Octolassium lacteum* Orley, *Lumbricus rubellus* Hoff, *Eisenia fetida* Sav) - 5 are the dominant species (*Lumbricus terrestris* Sav.,, *Eisenia submontana* Vejd, *Dendrobaena rubida*(Rosa), *Allolobophora rosea* Sav, *Allolobophora caliginosa* Sav.) - 3 species are sudominant (*Octolassium lissaense* Mich., *Eiseniella tetraedra typica* Sav., *Dendrobaena octaedra var. Typica* Sav.) - a species is recedent (*Allolobophora dugesi var. Dacica* Pop) - 3 species are surecedent (*Lumbricus castaneus* Sav., *Eisenia lucens*, *Dendrobaena alpina var. Typica* Sav.).

In terms of constancy of species analyzed is as follows: - 9 species are euconstant (60% of total species) - a species is constant (6.66%) - 2 accessory species (13.33%) - 3 accidental species (20 %).

CONCLUSIONS

From field observations and measurements made during the year 2011 we could collect a larger number of species than the previous year.

Species determined were then analyzed in terms of key environmental parameters, resulting in the following: to 9 of the 15 species are euconstant, being

present at all sites and species is constantly being reported in over 75% of sites that 2/3 of the species are constant or euconstant and only 1/3 are incidental or accidental.

The largest number of individuals collected was reported in the species *Lumbricus rubellus* Hoff (116) and the lowest number of individuals was reported in species *Dendrobaena alpina var. Typica* Sav. (2).

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